VOL. 126 January, 1961 NO. 1

MILITARY MEDICINE

ORIGINAL ARTICLES

Authors alone are responsible for opinions expressed in their contributions

PRESIDENTIAL ADDRESS*

The Military Role in Medical Progress

By

REAR ADMIRAL RICHARD A. KERN, MC, *U. S. Naval Reserve (Retired)*

CUSTOM requires that the opening session of the Annual Convention of the Association of Military Surgeons shall begin with an address by its president. This gives the members a chance to tarry over the second cup of breakfast coffee, to preview the exhibits, and then to appear in the meeting room in time for the more important presentations that follow. It gives the president a chance to express some personal views of not too great importance which will be embalmed in the pages of our Journal, there to be read chiefly by future presidents in search of ideas for their magnus opus. I am reminded of the conversation between Oscar Wilde and James Whistler, when Wilde, after reading in the paper a particularly apt phrase, exclaimed "I wish *I* had said that!", Whistler promptly came back with "Never fear, Oscar, you *will*." Any past-president who detects in my remarks the pallid semblance of his pet brain child should be assured that the similarity is purely intentional.

It is a very particular pleasure to welcome our guests from other lands. Your ever increasing numbers, with representatives from more than two score of countries, give this convention a truly international character of far-reaching significance. Medicine speaks a universal language. Therefore those engaged in the healing arts are the best ambassadors to promote good will and understanding: the foundation on which alone can be built the edifice of a lasting peace.

To implement this mission you have already made a tremendous contribution: you have learned our language. You already know what I have advocated at every opportunity to my fellow-countrymen: the importance, nay the necessity, of learning at least one additional language.

The man who speaks only a single language is like a person living in a room with but a single window. However much knowledge he acquires in that language, he simply makes that window larger. But as soon as he learns a new language, he puts a window in another wall, and thereby gains a wholly new outlook. Even if it be only a small and imperfect window, it nevertheless greatly enriches his knowledge and understanding. Not until you can talk to a person can you get to know, appreciate and like him.

I hope that your stay among us will be enjoyable as well as instructive, and that you will share with us your own rich experiences. When you return to your homelands, may you carry with you pleasant memories of your visit and an increased inspiration to further the cause of international harmony and good-will.

* Presented at the 67th Annual Meeting of the Association of Military Surgeons of the United States at its Opening Ceremony, October 31, 1960, Mayflower Hotel, Washington, D.C. Admiral Kern represented the Reserve components of the Armed Forces.

And now let me tell you something about ourselves.

This Association of Military Surgeons is a rather remarkable organization. It is not just another medical or dental society, or one of nurses or pharmacists. It is as unique as is its mission: to increase the efficiency of its members in meeting all the requirements of military medicine. Our membership therefore is open to all who have a share in insuring the best medical care of our military personnel, their families, and our veterans. Among our members are representatives of all professional and ancillary skills involved in such medical care, including those who produce our instrumental and therapeutic armamentarium: our Sustaining Members.

I am therefore pleased to report a healthy growth in our enrolled numbers, with a total of well over 6000 members, representing a net gain of over 12 per cent. I wish there were time to tell you more of our organization, its executive council with its sub-committees that evolve for our membership programs of services, such as various types of insurance, including one that we hope will implement dental care, our financial status (which is approaching real affluence), and much more, but these matters will be reported fully at the *Annual Business Meeting* today, which all members are urged to attend. Nor need I tell you of the Awards and Honors which the Association administers and which are described in the Program except to point out one very important new one: the Federal Nursing Service Award.

Just as this Association is an unusual one with a unique mission, so also it its monthly publication, MILITARY MEDICINE. Thanks to the fine editorial supervision of Colonel Bitner, and to the outstanding level of excellence which has been achieved by military medical research, our journal is receiving increasing recognition as a channel for recording the results of such studies and disseminating new knowledge in military medicine.

An added recognition of our journal is the decision of the Armed Forces Epidemiology Board to submit to us for publication certain reports of the activities of that Board and of its Commissions.

A most important event that relates to our journal is the recent action by the Department of Defense discontinuing the publication of the Armed Forces Medical Journal after the December 1960 issue. This will leave our MILITARY MEDICINE as the one journal in this country devoted wholly and alone to the field of military medicine and to the interests of those who are dedicated to the practice and the advancement of military medicine. The challenge to our Association is obvious.

There is needed for the officers of the Federal Medical Services a proper any sympathetic forum of publication. There is needed a ready means for exchange of military medical information. There is needed a repository for historical items of military medical import and a current bulletin board for personal notes and service news. In each of these compartments are also included the interests and participation of our colleagues in other lands. All of these items are important contributions to officer morale. All of them fall within the purpose of our journal. By enlarging its several departments and giving it increased editorial support, we can make our journal meet this greatest challenge in its history.

I have made several references to the uniqueness of our Association in its relation to military as compared with civilian medicine. The extent to which military medicine, both in its content and its emphasis, has diverged from civilian medicine is not fully appreciated, even by some military medical personnel. It is less appreciated among non-military medical groups. It is least appreciated by laymen, in or out of the military. When these laymen are in a position to control the budgeting of funds for research, as for instance in the Congress, or in the apportionment of such budgets within the Department of Defense, then their lack of appreciation of these differences can have regrettable consequences.

Let us take a look at these differences. The

problems peculiar to military medicine arise out of the abnormal and hostile environments to which military personnel are increasingly exposed, thanks to the tremendous advances in technical fields and in new and old weapons systems. The environment of operators of military equipment approach or exceed the limits of unaided human tolerance to such things as high intensity noise, vibration, complex accelerations, blast, extreme mechanical shock, underwater explosions, extremes of temperature and barometric pressure, radiation hazards in many guises, including cosmic irradiation. There are the problems of exposure to various gases, including those of jet exhausts and rocket fuels. The long submerged submarine of today is pressing the problems of a long-maintained self-contained atmosphere of the space ship of tomorrow. These are the more subtle but no less important psychological problems of prolonged isolation in a polaris submarine on station, and of weightlessness in a satellite.

The global distribution of our Armed Forces has also multiplied their medical problems. There are important and essentially military aspects to cold weather medicine and to tropical medicine.

In all of these environments, military medicine is faced not merely with preserving the health of the personnel but with maintaining them at top efficiency.

Of course, military medicine has much of common interest with other medicine, both in government and in civil life, but there is often a sharp difference of importance, and consequently of emphasis in research, in such problems as seen in military as compared with civilian practice. For example, certain diseases, of minor importance to young civilian adults, are of great importance when such individuals are crowded together in military service: respiratory infections, food poisoning, dysentery; or diseases of importance to civilians assume much greater importance in military operations: malaria, scrub typhus, schistosomiasis. Accidental trauma, important though it be in civilian experience, assumes an even greater significance in military medicine. Accidents are by far the most frequent cause of death among military personnel. They are responsible for increasing destruction of valuable equipment. The reasons for such accidents are increasingly inherent in personnel failure, rather then mechanical failure. Their study and prevention are therefore primarily a responsibility of military medical research.

All these changes have developed rapidly within less than two decades.

It is all the more remarkable that military medicine has solved many of these problems by an expanding program of research for which it has developed outstanding in-house capabilities, both in personnel and in laboratories.

This brings me to the theme of this year's scientific program: *"The Military Role in Medical Progress."*

Military medicine, in solving its own problems, is making an ever increasing number of contributions to the progress of all the healing arts and therefore to all human welfare. Let me cite you just a few of them.

Just as the pressurized cabin of civilian aviation had a military origin, so the oxygen supply of military aviators at high altitudes has been translated into the emergency oxygen mask for passengers in high-flying commercial jet planes in case of explosive decompression.

The experience gained by the Joint Committee on Aviation Pathology in conjunction with the Armed Forces Institute of Pathology through the investigation of aircraft accidents will promote air safety in civilian as well as military operations.

The studies on the defensive aspects of biological warfare are furthering the rapid diagnosis, treatment and prevention of human infectious diseases in all people and in every country.

The panel meeting on cholera tomorrow will give testimony to the important advances achieved in Thailand and Pakistan by a joint program of both military and civilian scientists, and from those countries as well as the

United States, and with the support of the South East Asia Treaty Organization.

The fruits of research in military toxicology are directly applicable to civilian experience.

The fine work on the prevention of heat casualities, to be presented this afternoon by Captain Minard, Medical Corps of the Navy and for which he will receive the Gorgas Medal, has immediate civilian uses. Now let us point out that this work was backed up by basic research by Dr. Kinsinger and his associates at the Naval Medical Research Institute, Bethesda, of so far-reaching and fundamental a nature that the chapter on heat regulation in all text-books of human physiology must be re-written.

You see, I have taken most of my examples from the scientific program of this session. I assure you that, if there were time, nearly every program item could furnish an obvious example of the significant and growing importance of the military role in medical progress.

Now all of this is probably well known to you. But it is not so well known to civilian members of the healing arts and it is little known and less appreciated among laymen, civilian or military. There is therefore a real need that we shall take it upon ourselves to inform our civilian medical and all our lay friends about the importance of military medicine and of military medical research.

This is necessary, in the first place, because of the general apathy that prevails in civilian ranks in peace times toward anything that smacks of military preparation. Those of us who have tried to arouse interest in reserve activities know how true that is.

Yet we must patiently persist in this work. Mass disaster of any kind and at any time will take its heaviest toll of those who are least prepared for it. Fortunately we are making headway in some quarters.

Six years ago, Kennedy in his "Oration on Trauma" before the American College of Surgeons made the startling statement that the average physician is graduated from medical school with less knowledge about first-aid than that possessed by a first-class Boy Scout. That is fortunately no longer true, thanks to the MEND program (Medical Education for National Defense) now operative in 82 medical schools, and fostering fine curricula of teaching and practice in military and disaster medicine. But I am sure that we need to do much more in other schools and groups: dentists, nurses, veterinarians, pharmacists, local health department personnel.

The medical profession generally needs to be aroused to the need for routine administration of certain prophylactic immunizations, notably typhoid and smallpox, so as to build up a significant pool of immune subjects in the general population. It is too late to stage an effective immunization program after mass disaster has struck.

The influence of this Association in furthering these aims would be greatly enhenced if there were established more local chapters in key population centers where there are stationed enough of our members to furnish leadership and to recruit others, especialy reservists. The New York Chapter has long been a shining example. Plans are under way to revive the W. W. Keene Chapter in Philadelphia. A dozen cities from Boston to San Francisco and from Chicago to New Orleans might well follow suit.

So much for our professional contacts.

There is also work to be done among our lay friends, especially in government and in the military, and particularly those who have to do with medical research budgets. To this day, many of them (I fear, a majority) are not aware of the differences between military medicine and medicine in general. They therefore see no reason for a separate research program for military medicine, but insist that all medical research "should be done in the universities and the civilian laboratories where it belongs." As a result the budget for military medical research has been practically stationary for the past 5 years, minor increases having been absorbed in increasing costs and overhead. The money

spent on Military *medical* research is a mere 0.15 per cent of the Defense research budget, and only a miniscule 0.006 per cent of the total Defense budget. During the same period Congress has increased the medical research budgets of non-military agencies by a staggering 500 per cent. Today *the pharmaceutical industry spends on medical research,* most of it in medical schools and hospitals, *more than five times what the government spends on military medical research.* Military medical research is being starved in an era of medical research plenty. You and I have a real service to perform in convincing the proper people of the need of correcting this state of affairs: the program of this convention provides you with some potent arguments.

Now I wish to express my sincere thanks and appreciation to the many people who have made this program possible. I begin with the U. S. Naval School of Music Band and the U. S. Marine Corps Color Guard that gave us such an enjoyable and impressive opening this morning, and the U. S. Army Band and the Armed Forces Color Guard who will honor us tomorrow. Then there are some 90 persons who will present their contributions at our several sessions. There are an additional 117 members of committees and officers who have been working for months to arrange every detail to insure your interest, comfort and entertainment. To all of these I am deeply grateful.

I offer my special thanks to those who organized and marshalled this impressive array of talent and planned the details of the session. Rear Admiral C. W. Schantz, as General Chairman, and his two assistants, Captain Pollard and Captain Stanmeyer, have given us outstanding service. The Chairman of the Scientific Program Committee, Captain Phoebus, MC, USN, himself for years a tower of strength in the Navy's program of medical research and now the Commanding Officer of an important research facility, the U. S. Navy School of Aviation Medicine at Pensacola, with his colleagues has arranged a series of presentations of exceptional merit, well-balanced and admirably suited to the central Theme; the resultant program will be at once the admiration and the envy of future chairmen. The man to whom we are most indebted for his devoted and efficient services not only in connection with this Convention but to our Association throughout the year, and the one upon whom I leaned most heavily, is our Secretary, Colonel Robert Bitner.

To our Sustaining Members we owe a very special debt of gratitude. They are listed in the program, with a statement of their special contributions to our meeting. Let us show our personal appreciation for what they and the other technical exhibitors have done to implement this fine Convention by visiting with them at their exhibits.

Let me conclude with my grateful thanks to you for the privilege of serving as your president.

THE WHITE HOUSE

WASHINGTON

Dear Admiral Kern:

It is a pleasure to send greetings to the members and guests of the Association of Military Surgeons of the United States assembled in Washington for their 67th Annual Convention.

Over the years, our military surgeons and their medical associates have contributed much to the strength of the national community. In this fast-moving age, they play a major role in the advancement of medical science. Their achievements have won renown in the military field and throughout the world.

I am delighted to add best wishes for a fine convention.

Sincerely,

Dwight D. Eisenhower

Rear Admiral Richard A. Kern, MC, USNR, Ret.
President
The Association of Military Surgeons
of the United States
1726 Eye Street, N. W.
Washington 6, D. C.

DR. LEROY E. BURNEY, SURGEON GENERAL, U. S. PUBLIC HEALTH SERVICE

Our New President

DR. LEROY E. BURNEY, The Surgeon General of the U. S. Public Health Service, became the 66th President of the Association of Military Surgeons of the United States on January 1. He was elected to this position by members of the Association during the 67th Annual Meeting held in Washington October 31, November 1 and 2.

Dr. Burney was born in Burney, Indiana, December 31, 1906. He attended Butler University and Indiana University. From the latter university he received his B.S. and M. D. degrees. In 1932 he received the Master of Public Health degree from Johns Hopkins University. He was commissioned in the Regular Corps of the Public Health Service in that year. He has spent his entire professional career in public health activities.

In 1939, he was assigned to the Georgia State Health Department in its venereal disease control program. He was recalled to Washington in 1943 to be Assistant Chief of the Division of State Relations. He was Director of District No. 4, Public Health Service, New Orleans, in 1945, and in July of that year was loaned to the State of Indiana to become State Health Commissioner. This position he held until 1954 when he returned to Washington. At the time of his appointment on August 3, 1956 as Surgeon General of the Public Health Service by President Eisenhower, Dr. Burney was Assistant Surgeon General and Deputy Chief of the Service's Bureau of State Services.

As Surgeon General he has been Chief Delegate of the United States to the Tenth, Eleventh, Twelfth and Thirteenth World Health Assemblies, serving as President of the Eleventh World Health Assembly in 1958.

His broad knowledge of public health affairs in the United States and throughout the world will be of inestimable value in guiding the affairs of our Association in these days of great international activity.

Address

By

DETLEV BRONK,* A.B., M.S., PH.D., D.Sc., LL.D.

President, National Academy of Sciences

ADMIRAL KERN and friends of the Association, it is a very rich personal privilege to meet with you. First, because I do so during the tenure of your president with whom I had the great privilege of being associated with as a colleague at the University of Pennsylvania well nigh on to twenty years and whose family and mine have had long and affectionate relationship, which have revealed your president to me as a man of rare personal quality. It is also a privilege to meet with you because much of my life has been lived in association with you who apply medical knowledge to military personnel and problems. But those are personal matters.

It is more significant that I should do what I am now doing on behalf of the National Academy of Sciences and its National Research Council. That organization which so many of you have been affiliated with in many helpful capacities has throughout its existence been intimately related to the Armed Forces. The National Academy of Sciences was formed during the Civil War in order to aid our country in the application of science to the reunion of the North and South. The National Research Council was created during the First World War to bring to the service of our Nation and scientific counsel of many more than were included in the limited roster of the Academy itself. Throughout the 100 years of our existence, we have devoted much of our peacetime activity to the marshalling of the forces of science and to those who apply science in medicine, agriculture, and engineering, and to the continuing preparation of our Armed Forces for the defense of the ideals we hold high. We have, therefore, endeavored to do what Dr. Kern has said to you is so often not done in times of peace. And, then, because so many of you who are here are from other countries, I would go on to say that one of our most important activities has been the maintenance of international relations between the scientists of this country and those of all other countries. This is one of our most prized privileges—the development of a wider recognition of the unity of science in all countries and among all peoples. So you see that we of the Academy and Research Council have a lively interest in the theme of this meeting ("Military Role in Medical Progress"). Throughout recorded history there has been a close association between the arts of war and the development of science. I need not remind you of this association of that fact.

I believe it is all too seldom realized that some of the greatest scientific discoveries had a military origin and emphasis. Leonardo certainly carried on a great many of his investigations which laid the foundations for much of modern science because of his need for the development of military technology. Much of the incentive for scientific endeavor has been that of military need. Much of the support of science has been provided because of hoped—for contributions of science to military strength. This always makes me pause. I must confess to you that much thought has been given for what I am about to say to you in an effort to resolve in my own mind how it is that science, which is directed to the furtherance of human welfare, should be so intimately associated with the arts of war. This relationship between science, which is a means for enriching the life of mankind and which supports military effort that is devoted to the furtherance of evil ends or defense against forces, provides one of the great troubling ethical dilemmas of science. I have struggled with my thoughts

* Dr. Bronk was presented to the 67th Annual Meeting at its opening session by Rear Admiral Richard A. Kern, President of the Association of Military Surgeons.

and emotions; whether I have been able to resolve them all or not, despite the fact that I have been doing so for more than two decades, I leave to you.

I recall last year reading in the *New York Times* this statement by one of the leading politicians, if not one of the great politicians of the City of New York: it ran in these words, "Today man stands helpless but for the onslaught of science." Such an apparent conflict between the creative and the destructive forces of science is especially relative to the functions of the military surgeons. Much of his role, my role, is concerned with the preservation of life in a conflict in which life is being destroyed. The obvious easy answer to this ethical dilemma is that science is knowledge and understanding. Man uses knowledge as he will for good or evil purposes, for wise or foolish ends, for creation or for destruction, for a desirable or an asserted life.

A great but too little recognized role of the military surgeon is his emphasis on the human potentialities of science; his emphasis on these despite the fact that he is involved in what is, of necessity, the furtherance of the means of man's survival against the evil forces and against the inhospitable environment in which man is thrown. That the military surgeon is able to reserve a lively concern for the welfare of man, despite the fact that he is engaged in a section of society which is concerned with the destruction of man, is evident through his services to friend and foe. The military surgeon conserves life. Man must decide *how* he will live.

I will extend my consideration of this function of the military surgeon and physician to the role of the surgeon and physician in times of peace. Again I would say, the physician is a conserver of man's ability to live. The widening scope of medical knowledge enables the physician to reassert his traditional role as a guide and determinant of how man lives. What I have in mind is this—to increase the number of man's days between birth and death is not necessarily increasing the days he truly lives. For many, the long span of years between birth and death is but a longer span for mere survival without the satisfaction of a creative life that distinguishes man from all other of God's creatures. The eternal challenge man faces was given to Job when the voice out of the cloud said, "Hast thou understanding?" So it is that the real reason for scientific inquiry is that man is that one among all of God's creatures who has the power of understanding.

A man does not fulfill his spiritual destiny by merely existing while protected against the destructive forces. nor do men fulfill their rightful destiny if some use knowledge to gain selfish ends by suppressing others who have less knowledge. I like to think that our real high mission is concerned with making what we as a nation learn known to others who have less opportunity to acquire that knowledge. This is the real reason the various forms of our mutual assistance programs have been undertaken. It is our growing hope that all of our knowledge be made universally available because of the universal character of science in all knowledge and understanding. In these days of rapidly evolving science with consequent new powers for the greater expression of a more vital rewarding life, we need more persons, who like physicians, devote themselves to enabling man truly to live, and to do more than merely survive. Admiral Kern has suggested to me one of the significant aspects of this relationship between the military surgeon and the creation of a better, more satisfying way of life. He has spoken of the relationship of the military surgeon to creating a more favorable environment for the continued life of man despite the frequently hostile environment which man creates.

Let us consider the role of the machine, some aspects of which Admiral Kern has spoken. A machine, I take it, is a device to enable man to do what he cannot do by his unaided natural powers of the body and of his senses. Through instrumentalities it is now possible for man to hear what he cannot hear unaided, to see what he cannot see unaided, to think thoughts that he cannot think

unaided. All of the machines which extend the powers for the exertion of forces which the human body cannot unaided exert, give to man great new powers. But how often in modern society is the development of these forces guided wisely with regard to the powers and characteristics of the human organism?

It was my partial duty during the Second World War to be concerned with the provision of instrumental aids to man so that man could use the machines for flying which had been evolved out of science and technology. Yet I, as did many flyers in the First World War, found that the development of science had enabled man to go into a hostile, if you will, environment in which he could not live. So hastily we had to devise the oxygen equipment and ultimately the pressurized cabin in the evolving capacity of man to fly. It was done only when under the stress of war it became suddenly obvious and necessary. I might say, also, in passing, that there are few who ride across the continent and across the seas in pressurized cabins who think back or even stop to wonder how it is that the pressurized cabin was developed. Nor do they pay any respect to those of the Air Force who developed this means so that all men can travel safely or rapidly at higher altitudes and in greater comfort.

The fact that man can now see into far outer space, to distances never made possible before, the development of radio-astronomy is another brilliant example of how the powers of men have been greatly extended. I would remind you that much of radio-astronomy has been stimulated by the needs of the military forces of this and other countries. Speed of movement, capacity for thought, ability to think as man has never been able to think before, through digital and analogue computers, are mere examples of what can be multiplied endlessly, of how the union of the physician and the engineer can make a more desirable way of life, despite the fact that we surround man more and more with man made conditions which so often are unfavorable to life. The military surgeon has recognized the need for this partnership. Partly because, as I have said, he is so often confronted suddenly with new instrumentalities for offense and defense which cannot be used unless redesigned; unless the gap between the new instrument and the environment is bridged by secondary devices that enable man to use what man creates. This is in large part also, I believe, due to the fact that the military surgeon has developed his role as a member of the staff of those who shape the conduct and the condition under which man operates in the Armed Forces. If we could develop a tradition in this and other countries of calling upon a physician as a guide and an aide to those who shape our new man made environment, we could have a better and a more desirable way of life in this expanding material civilization which man is rapidly building for himself.

I recall a year or so ago, when returning to New York one evening from Washington. Three events of that evening still stand out vividly in my mind. The one was as I went through the National Airport. I passed a group of people who were angrily protesting the announcement that the flight for Los Angeles would be delayed twenty minutes. I thought to myself how sad it was that these people who had been given the means to go in a few short hours across the continent, whereas their ancestors had to use an ox cart or go around the Horn in a sailing vessel, were irritated because they had been denied a few moments of rapid travel. I also wondered what they would have done with those twenty minutes had they got to their destination at the scheduled time. Then, as I passed the telephone booth, I heard an irate man berate the Operator because a call to Kansas City would be delayed five minutes. Again I thought how little is the appreciation of man of the means whereby he can talk across a thousand miles. A thing to fill a man with wonder, also, I should hope, is the pride in the fact that he is a man. Then we flew to New York. It was a clear winter evening.

As we came into that glorious city of light, having bridged the 250 miles in less

than an hour, I was filled with pride in being a man. That one of all God's creatures has the power of understanding. But then as I drove from LaGuardia Airport to the Carlisle Towers, through the slums of that great city, my pride became colored somewhat with humility. The contrast between what man can do to make possible the greater powers, the greater experiences, the greater capacity to live, and what he really does is too overwhelming to permit pride to remain untarnished. But then, as I went to my nest in the top of the Tower and looked out over the great city once again I thought that after all man can do better by his fellow men if he will. I was reminded of Edwin Markham's lines, "Why build these cities glorious if Man unbuilded goes? In vain we build the world, unless the builder also grows."

And so, what I have gained mostly in my long years of association with the military surgeon and with the military commandant and with that man who directs the course of our military defense is this—that we are concerned with the maintenance of life but what man does with life depends on man himself and upon his fellows. If the military surgeon can guide the developments of weapons so that they can be used, and if he can build an environment in which life can be lived, why can we not have a similar association between the physician, the engineer, the statesman, the politician, and the city administrator. We can if we will. What we need is wisdom to deal with knowledge and the spirit of human consideration for others which is the primary role of the physician, be he military or civilian.

Because there are so many of our friends from other countries here, I would go on to say just this—whether our prestige is high or low, I care not. I care not, but I do care that we should have noble aspirations, not only for ourselves but for all people. We are men. Man—that one among all God's creatures who has the power of understanding the rights and needs of other people. Only so can we go forward to that day when the military surgeon will not be the military surgeon he is today, but the military surgeon who fights, not other men, but the forces of ignorance, prejudice, and who adapts man to not a hostile environment but to the natural environment to which man can always learn to live in peace and accord.

If we, as a people, are sometimes difficult in our relationship to other people, if you find us lacking in desirable attributes which you would rather see us have, if you think some of the things we do, some of our aspirations are noble, remember this—we are a young evolving nation, we are you from other countries, we are but an amalgam of all peoples from all nations, from all parts of the world. Those things which are not as they should be came from your countries. Those things which you find admirable are the characteristics we inherited from you; from our fathers and mothers who came from your lands, which we like to think of as our lands also. We are all people devoted to the furtherance of the welfare of mankind. You as physicians make it possible for men to live. But mere survival, mere existence is not living. We have a great and challenging opportunity to work with all other people, making the long span of years between birth and death an opportunity truly to live, not merely to survive. And also I would have you think on this—that as man uses scientific knowledge for the creation of a man-made world, he should shape the world so that he may live a more rewarding life.

Recently I attended the 60th anniversary dinner of the Hall of Fame, which is an American Institution for remembering those men who served mankind greatly. There was much discussion of what constitutes a great man and a famous man. I think all agreed that the definition of a famous man was properly given in the benediction of a 104 year-old clergyman. He concluded his brief call to the greater spiritual quality of man with this, "Give us wisdom to deal with knowledge." I would add, "Help us to use our knowledge wisely." That, I take it, is the greatest role of the physician.

Panel of Chiefs of Federal Medical Services

Doctor Frank B. Berry, Assistant Secretary of Defense (Health and Medical) presided at this Panel. His Prefatory remarks follow. (Editor)

A WEEK AGO, I attended a most impressive service at the National Cathedral of this city in commemoration of the United Nations. As you know there was also held recently in the City of New York a rather interesting session of the United Nations.

I was much impressed by the ceremony at the Cathedral. I was reminded this morning of that ceremony because of the flags which are behind us here and in front of you. During the ceremony at the Cathedral all the flags of the nations of the United Nations were placed before us. A passage from the Book of Isaiah in the original Hebrew was read to us by a Rabbi, and was later translated into English. I have thought of the same unity each time I have had the privilege of visiting SHAPE Medical Conference, and the North Atlantic Treaty Organization near Versailles. I thought of that unity again last spring when I was privileged to attend the World Health Organization in Geneva as a guest of Dr. Burney, in which I saw all the nations working together. This was emphasized by Dr. Bonk this morning.

In the work of the Department of Defense and the Services, the Joint Committee on Aviation Pathology has been mentioned. This committee has been joined by our Federal Aviation Committee and the Civil Aeronautics Board. The idea for this committee came from one of our liaison officers, Squadron Leader Bruce Harvey from Britain. The committee as originally organized consisted of Great Britain, Canada and the United States. The Services joined with us. I say with us, the Department of Defense, the Department of State, The Department

U. S. Army Photo

(L. to R.: Surg. Gen. Leroy E. Burney, USPHS; RAdm. Richard A. Kern, Pres. Assoc.; Dr. Frank B. Berry, Ass't., Sec'y. Defense (Health and Medical); Lt. Gen. Leonard D. Heaton, Surg. Gen. Army; Maj. Gen. Oliver K. Niess, Surg. Gen. Air Force; RAdm. E. C. Kenney, Deputy Surg. Gen. Navy; Dr. William S. Middleton, Chief Med. Dir., Vet. Adm.

of Health, Education, and Welfare of which the Public Health Service is a part, the Department of Agriculture, our International Cooperation Administration, and the Atomic Energy Commission. All these in the conduct of many surveys.

For food, for nutrition throughout the world, into whatever country they go on invitation of that country, they are joined by the representatives of the World Health Organization, the Food and Agriculture Organization, the International Cooperative Agency, and the UNESEP groups of those countries. Consequently each year we find these flags more meaningful.

The Services, Army, Navy, Air Force, Public Health Service, Veterans Administration are always working along similar lines. They always join in many of these International projects and they have representatives in many of the countries throughout the world and are some of our best ambassadors in those countries.

General Niess organized and has continually fostered a meeting of military officers throughout the Far East. The Army has an officer teaching pathology in the American University in Beirut. There is a cholera laboratory in Thailand. The Navy for many years has maintained a laboratory in Cairo, and in more recent years in Taiwan. All of these contribute not only technical knowledge for the biological and medical professions but are some of our best ambassadors to the medical and dental professions throughout the world.

It is now my pleasure to let each Service speak for itself.

The Army Role in Medical Progress*

By

LIEUTENANT GENERAL LEONARD D. HEATON, *The Surgeon General of the U. S. Army*

IN HARMONY with the theme of this meeting, I have chosen as my subject—*The Army Role in Medical Progress.* This is a subject which, as a member of the Army Medical Service, I can discuss with a great deal of pride and satisfaction. The Army Medical Service has indeed made substantial contributions to medical progress and has done so consistently throughout its brilliant history. In peace and war, the solution of medical problems has served to enrich medical knowledge and increase the ability of the physician to save lives and maintain health in the civilian community as well as in the military service.

I have often thought about the great advances in military medicine and their relationship to overall medical progress and I have wondered about the factors, or perhaps a common denominator, which stimulated these developments.

Medicine *wherever* it is practiced has a common mission and a common heritage. The aim of *every* physician is to maintain the health of the individuals in the community he serves. Throughout the world, the medical profession is bound together by a common devotion to the welfare of the patient and a single high code of ethics expressed so admirably in the oath of Hippocrates. Medical practice, worldwide, is based on a common body of knowledge developed through the centuries of medical progress; in no field of human endeavor is there a more complete and willing exchange of knowledge than in the field of medicine.

But, there are also variables in the practice of medicine. The physician himself is an important variable. The body of medical knowledge may be common to all but its use, interpretation, and application will vary with each individual physician. This is one of the reasons why, although medicine is a science, the practice of medicine is an art. Another variable is, of course, the patient. As we all know, no two incidences of disease or injury are quite alike. Furthermore, illness can never be disassociated from the patient himself and no two patients present the identical problem. There is also the variable of the environment, and I use this term in its broadest sense. Neither the patient nor the doctor can disregard the environment in which he functions. The normal occupation of the patient, individual and community aims and attitudes, available resources, and other environmental factors have an important bearing on medical decisions.

In all of the variables I mentioned, military medicine has a favorable position which provides a rich soil for medical progress. The patriotic call of the military service has attracted men of high ideals and loyal devotion to duty. The challenging problems of the military medical profession have attracted men of competence, searching minds, and the will and energy to work for the benefit of mankind—men of the caliber of Jonathan Letterman (evacuation of wounded); Joseph J. Woodward (photomicrography); George M. Sternberg (bacteriology); John S. Billings (vital statistics); Charles F. Craig (dengue); Joseph Lovell (U. S. Weather Bureau and National Library of Medicine); William Beaumont (process of digestion); William A. Hammond (Armed Forces Institute of Pathology); Walter Reed (yellow fever); Edward B. Vedder (Beriberi and Amebiasis); William C. Gorgas (sanitation of the Panama Canal Zone); Carl R. Darnall (chemical purification water); William Keller (general and thoracic surgery); Joseph Siler (dengue fever); James S. Simmons (global preventive medicine and public

* Presented at the Panel of Chiefs of Federal Medical Services, 67th Annual Meeting of the Association of Military Surgeons of the United States, Washington, D.C., October 31, November 1 and 2, 1960.

health); Merritte Ireland (field medicine and medical administration); Elliot Cutler, Edward D. Churchill, Frank D. Berry (surgery—World War II); Fernando E. Rodriguez (work on dental caries); Raymond A. Kelser (transmission of surra in horses); Joseph E. Smadel (scrub typhus); Maurice R. Hilleman ("Asian" influenza). I could mention many others who have studded the brilliant history of the Army Medical Service, but I have chosen these to illustrate the wide range of contributions to medical progress throughout the history of the Army Medical Service. You will also not that the contributors are not limited to physicians alone, but include Dental and Veterinary officers and civilian employees of the Army Medical Service. There are hundreds more of equal caliber whose names are not connected with a specific major medical discovery but to whom we are indebted for the gradual but constant improvement in diagnosis and treatment of patients which, although less spectacular, is nevertheless the backbone of medical progress.

The patient is both the research and teaching material of the medical profession. In this respect, the Army Medical Service has a unique advantage in the study of medical problems. Patients in Army medical facilities represent all the variables found in civilian medicine. Moreover, because the Army operates or may operate anywhere in the world, there are also opportunities to observe exotic diseases rarely seen in the United States—Dengue, Beriberi, Scrub Typhus, Schistosomiasis, Malaria, Cholera. More important, the patient load in military facilities often provides large concentrations of patients in many surgical and medical categories which lend themselves to mass observation and statistical evaluation so important to medical research—hepatitis, adenovirus, influenza, trauma, cold injury and even the Munson shoe illustrate the point.

In terms of the broad environment, military medicine provides a particularly favorable situation for medical progress. Centralized organization and direction of the medical effort, control over the movement and concentration of patients and centralized control of resources are important contributing factors. However, if I were to pick the most important *single* factor, a common denominator so to speak, of military medicine in its role in medical progress, I would say it is the weight and urgency of the problems with which it is so frequently confronted. I am sure that someone somewhere would have eventually discovered the life cycle of the yellow fever virus but, it was the urgency of the problem that led to the great work of Walter Reed. It was the exigencies of the military service that stimulated Doctor Darnall to develop chemical purification of water which, perhaps, has saved more lives in and out of the military service than any other discovery in medicine up to this time. It was in response to the urgent demands of the situation that Doctor Cushing, during World War I, established the principles of debridement of craniocerebral wounds. During World War II, it was also the great and urgent exigencies that brought the civilian investigators and the medicomilitary clinicians together and were largely responsible for the development of present day antimalarial drugs. Throughout our history, the fate of the Nation has depended repeatedly upon the strength and effectiveness of our military forces. The military medical problems, therefore, demand solution with a sense of importance and urgency unparalleled in any other element of the medical profession. This demand, combined with a generally favorable environment for research, has accelerated progress in military medicine to the benefit of the entire medical profession.

In considering the military role in medical progress, one must keep first and foremost in mind that military medicine is an integral part of total medicine, and that progress in military medicine *is* medical progress. The Army Medical Service provides medical support to a sizeable segment of our population, and the military community has basically the same medical problems as its civilian counterparts. Our clinics and hospitals have their share of medical, surgical

and neuropsychiatric emergencies, the more protracted ailments, pediatric and geriatric cases, and, of course, very active obstetric and gynecology services. The medical progress we achieve in the diagnosis and treatment of these ailments is directly available for use to civilian medicine and is part and parcel of total medical progress. Colonel Woodward's work on photomicrography in 1862 continues to serve world medicine today. William Beaumont's observations of the process of digestion could have been conducted in any hospital, military or civilian. Doctor Hilleman's isolation of the agents responsible for Asian influenza was directly and immediately available to the civilian as well as the military population of the United States.

As I indicated previously some of the problems of military medicine, particularly those related to combat and preparation for combat are of primary importance to the military service, but have their counterparts in, and their solutions are applicable to, civilian medicine. The extensive research conducted by the Army Medical Service on blood and blood plasma was directed toward the solution of problems peculiar to the military service but most of its findings are applicable in civilian medical practice. The extensive research on burns is directed toward improving our readiness status for nuclear warfare, but the findings are a direct contribution to medical progress in the treatment of burn victims from any cause, including kitchen accidents. The principles of management of orthopedic cases which were developed in World War II are largely those utilized today. Likewise are those of thoracic surgery although, of course, newly developed equipment, such as heart-lung apparatus have increased our capabilities in this field. The principles of neurosurgery of trauma developed and followed in World War II, refined more during the Korean War, are sound and practiced today in the best medical centers. The specialty of radiology really "came into its own" during World War II.

I could go on and on giving examples of progress in Army medicine and demonstrating its relationship to total medical progress. But, these are all well known to you and there would be little advantage in belaboring the point. I would rather call to your attention some relationships which are more likely to escape notice.

Because the Army must be prepared to operate in any area of the world the Army Medical Service has a natural interest in the health situation and medical problems of all countries. The Army Medical Service not only seeks out and stores this knowledge but participates in the medical research in a number of areas in the world. Also, we are frequently asked to assist with medical problems in foreign countries which gives us the opportunity to become acquainted with these problems. For example, Colonel Benenson has recently returned from Poland where he assisted with an immunology problem. In furtherance of the foreign policy objective of the United States, Army medical officers serving in overseas areas are encouraged to participate in local medical activities and pass medical knowledge on to the inhabitants of those countries. In a real sense, the Army Medical Service is a liaison arm between American and world medicine, which is so vital to medical progress throughout the world.

All of the physicians in the Army Medical Service have received their basic medical training in civilian schools. Many have had their internship and residency training in civilian hospitals and others, particularly during periods of war, have come to the Army with considerable experience in civilian medical practice. But, this is a two way street. An ever increasing number of civilian physicians receive their internship and residency training in Army hospitals and gain much of their medical knowledge and experience in military medical practice, and some in Army medical research. Recently, I have had the honor to deliver the J. M. T. Finney Fund Lecture at the Annual Meeting of the Medical and Chirurgical Faculty of the State of Maryland. I found it difficult, and I may add unnecessary, to distinguish the military from the civilian career of this

illustrious surgeon. Perhaps it is the combination of the two careers that has enabled General Finney, or Doctor Finney if you prefer, to contribute so richly to medical progress both in his military and civilian status. The same could be said about Doctor Ravdin, Doctor Bayne-Jones, Doctor Churchill, Doctor Cutler, Doctor DeBakey, Doctor Menninger, Doctor Rankin, Doctor Elkin and hundreds of others who have left their stamp on both military and civilian medicine.

This is true not only of the civilian physician who serves in the Army during part of his medical career, but is becoming increasingly true of the career medical officer. The increased span of active life and earlier retirement age have made it possible and advantageous for medical officers to remain active members of the medical profession after retirement from military service. These officers continue to contribute to progress in all phases of medicine, but particularly in the fields of education and medical administration. Many of you gentlemen recognize this fact from your own experience and the careers of many of our friends. The recent International Congress on Burns was chairmanned by a retired medical officer, Doctor Artz. Many important medical positions at National, State and local level are held by men of many years experience in the Army Medical Service.

For most physicians at present and in the foreseeable future medical careers are a combination of military and civilian training, experience and inspiration. I seek no special credit for the Army but I am proud that the Army plays an important role in the development of these men and in their contribution to medical progress.

There is another line of demarcation between military and civilian medicine that is rapidly disappearing. The phenomenal advances in transportation and weaponry have widened the combat zone to include the home base. The responsibilities of the Army Medical Service for battle casualties and the responsibility of the civilian medical profession for civilian casualties in nuclear, chemical or biological warfare present much the same problem. The military can, do, and will continue to play an important role in medical progress in this area. It is natural for the Army to concentrate heavily on these problems, to provide the best possible solutions and to help train the civilian medical profession in readiness to meet the situation should it ever occur. We are continually studying the mass casualty problem and are transmitting our findings to military and civilian physicians through our mass casualty courses and professional publications. We have developed and are now testing a casualty assessment procedure which promises to provide this vital information in detail in a matter of minutes. We are continuing to make progress in the preprotective field against radiation sickness. We are concentrating on both the preventive and curative aspects of every foreseeable hazard to human life and health. Medical progress in this area is both vital and urgent.

I have tried to outline briefly the military role in medical progress and to examine the conditions that surround it. I have found that the military mission and the military community provide both the stimulus and the favorable media for medical progress and that progress in medicine, whether directed toward solution of military or civilian problems, is of equal value to both. Perhaps the most significant lesson is that a demarcation between military and civilian medicine has never been too significant and is becoming less meaningful day by day. This is but one additional reason why military and civilian medicine must work as one to accelerate medical progress for the benefit of all mankind.

The Army role in medical progress, as well as the role of civilian medicine in the progress of the Army Medical Service, can be summarized best in the words of Rudyard Kipling—

"I had six honest serving men
They taught me all I know
Their names were where and what and when
And why and how and who."

Activities of the Medical Department of the U. S. Navy*

By

REAR ADMIRAL EDWARD C. KENNEY, *The Deputy Surgeon General of the U. S. Navy*

I WILL outline briefly some of the activities of the Medical Department of the Navy during the past year. There have been some important achievements during this period and a number of interesting events have occurred. Because of our success and progress, it is my belief that our efforts should continue to be directed toward the same general goals during the coming year, except for those modifications which will be required by changes in the overall mission of the Navy. I would like to open with a few general statements concerning the recent activities of the Medical Department of the Navy and then return to each area later and give amplifying details.

During the past year emphasis on improvement in all facets of medical care has been continued and the results have been rewarding.

This year also saw continued efforts in all programs relating to the military medical specialties of Astronautical, Aviation, Submarine, Amphibious and Field Medicine, and ABC Defense. Increasing knowledge in the military medical specialties has resulted in new plans, procedures and practices as related to these fields.

Research studies in clinical, preventive, occupational, and military medicine have been pursued and important contributions have been made in each of these areas.

High professional standards for all personnel have been encouraged by various policies and high morale and superior performance of our personnel has been maintained.

The Navy demonstrated sustained progress in medical care during the past year. Patient care continued to be our primary consideration in this area and received a preponderance of the Medical Department efforts. Navy physicians, dentists, nurses, allied scientists, hospital administrators, and hospital corpsmen functioned in well integrated teams and rendered outstanding medical care to our patients.

The health of the Navy remained excellent. There were no major epidemics in Navy and Marine Corps personnel despite their deployment to every corner of the world. In Fiscal Year 1959 approximately 12 out of every 1,000 active duty personnel were on the sick list each day of the year. This past year, in spite of a slightly higher admission rate, the number of naval personnel off duty due to illness was 11 per 1,000. This favorable influence on the non-effective rate was the result of a program in all medical facilities designed to reduce patient stay without prejudice to a high level of professional care. When this program was started active duty Navy and Marine Corps patients were having an average patient stay of 34 days and by June 1960 this average had dropped to 29 days. Maximum use of readily available out-patient services also played its part in keeping personnel at their duty stations. Navy and Marine Corps personnel made approximately 5½ million out-patient visits.

Dependent care in naval medical facilities increased substantially in Fiscal Year 1960. Dependent admissions increased 7% and out-patient work units were 12% higher. There was a 23% increase in births over the previous year.

The Secretary of Defense and the Secretary of Health, Education, and Welfare approved the restoration of certain civilian medical and surgical services for the dependents of active duty personnel effective

* Presented at the Panel of Chiefs of the Federal Medical Services, 67th Annual Meeting of the Association of Military Surgeons of the United States, Washington, D.C., October 31, 1960.

on 1 January 1960. The restoration of these services corrected the inequities and hardships for those dependents who do not have access to service facilities for care and treatment of certain conditions. The current "free choice" restriction which applies to dependents residing with their sponsors insures that Navy medical facilities will be fully utilized in the care of dependents to the extent that staff, facilities and funds are available.

It is interesting to note in passing that despite the gradual reduction from 1956 of active duty strength of the Navy and Marine Corps, there has been a steady increase in the dependent population. During this period the average number of dependents per active duty man has increased from .88 to 1.16 or about 24%. These figures do not include the dependents of retired or deceased personnel.

There are special facts and observations pertaining to medical care which I would like to mention. A blood bank for rare types of blood was established at the Chelsea Naval Hospital in cooperation with the Protein Foundation of Harvard University, the American Association of Blood Banks and the Massachusetts General Hospital. This was possible as the use of glycerolized frozen blood has now been accepted and it can be stored for two years. This frozen blood has been used successfully in open heart surgery utilizing extra-corporal circulation and has obviated the problem of supplying large amounts of fresh blood on the day of surgery. The results of open heart surgery at our centers have been excellent and these open heart surgery centers are increasing the number of cases operated each week.

The Tissue Bank at the Naval Medical School provided 1,140 tissue deposits to military and civilian physicians in the United States and throughout the free world. This was accomplished in addition to continuing its investigative studies in this relatively new field.

Psychiatric screening of all personnel for *Deepfreeze 1960* was quite successful. The Commander of the U. S. Naval Task Force, *Antarctica,* reported there were no disciplinary infractions in the entire force during a 12 month period. Screening of personnel for *Deepfreeze 1961* has recently been completed. Similar but less intensive screening is given all Navy and Marine Corps recruits upon their arrival at training stations and recruit depots. This enables us to screen-in recruits who are marginally adjusted and to screen-out those who are incapable of adjustment.

The Dental Division found the dental health of recruits to be poor and a high percentage of dental personnel had to be assigned to care for their defects. Over 6% of all recruits required extensive dental treatment and had to be placed in a "Holding Company" to complete their treatment prior to commencing training.

New patient care facilities have been recently completed. The new hospital at Portsmouth, Virginia, an 800-bed hospital, was commissioned in April and was occupied in June 1960. The new hospital at Great Lakes, Illinois, another new 800-bed institution, is scheduled for occupancy soon. An addition to the U. S. Naval Hospital, Bethesda, Maryland is currently under construction. Four new station hospitals and nine new dispensaries were completed or were under construction during the past year.

We also participated in medical care activities which were of importance from the standpoint of international and public relations. Captain Edward A. Anderson, Medical Corps, U. S. Navy, was sent to the Sudan in November 1959 with an injector spray apparatus under the sponsorship of the International Cooperation Administration to carry out mass yellow fever immunizations. His outstanding accomplishment was highly commended by the Sudanese Government, the American Embassy in the Sudan and the International Cooperation Administration. Later in the year the same medical officer was flown to Brazil at the request of the same agency to give typhoid and paratyphoid immunizations with the injector spray apparatus. During the past summer his services were requested and

used in the state of Rhode Island to control a poliomyelitis outbreak by this rapid method of giving immunizations. Personnel of the Naval Medical Research Unit #2 (Taiwan) returned to Thailand to continue their cholera studies and they made significant additional observations. Captain Thomas Canty, Medical Corps U. S. Navy, travelled to Mexico City at the request of the International Cooperation Administration to assist in the establishment of a Limb and Brace Shop in the Mexican Institute for Rehabilitation of disabled people.

While the traditional phases of medicine which are concerned with patient care remained of paramount importance, there was continued and increasing emphasis on the military medical specialties. Astronautical Medicine, as you know, is currently engaged in the national effort to put a man into space. There are six naval laboratories which are engaged in various phases of Project Mercury. The Mark IV pressure suit which was designed at the Naval Air Crew Equipment Laboratory has been selected as the one to be worn by the astronauts. Some modifications were necessary and the astronauts have been trained in its use. The Dynamic Flight Simulator at the Aviation Medical Acceleration Laboratory was used to give the astronauts a realistic idea of acceleration stress and the "Human Disorientation" device at Pensacola will be used to determine man's tolerance to tumbling, rotating and isolation since this information will be vital to Man's space flight. (The Navy has also been assigned the responsibility for recovery of the Mercury capsule at sea and for all medical operations involved with recovery of the astronaut at sea. Initial planning for the medical aspects of the recovery program for Project Mercury was accomplished by Captain Ashton Graybiel, Medical Corps, U. S. Navy, the Director of Research, School of Aviation Medicine, Pensacola, Florida. In addition, consultants in each of six clinical specialties have been assigned along with other medical officers and corpsmen in support of Project Mercury.) Every effort is being made to cooperate in all possible ways with this program and with the National Aeronautics and Space Administration.

Medical Department Personnel attached to duty with the Marine Corps were given "on-the-job" indoctrination or attended one of the field medical service schools. Senior Medical Officers from some of our hospitals were assigned periods of familiarization with the Marine Corps Divisions. In addition, there has been complete reorganization of the plans for medical augmentation of Marine Corps combat units and the Marine Corps field medical supplies and equipment are constantly being studied and updated.

Significant accomplishments in Aviation Medicine have also been made in the last year. Three 1,000 feet low pressure chambers were designed and are being installed at Marine Corps and Naval Air Stations. The Mark IV full pressure suit which was previously mentioned in connection with Astronautical Medicine, is now fully operational. This suit provides environmental protection in that it is air conditioned for hot weather, insulated for cold weather, supplies oxygen for high altitudes and the necessary pressure envelope for cabin decompression emergencies above 50,000 feet. Delivery and testing of the new Mark V exposure suit by personnel at operational units is underway.

A program of hearing conservation has been under study aboard carriers and air stations and an evaluation of protective devices is now in progress.

All medical aspects of ABC Defense and of ionizing and nonionizing radiation were evaluated on a continuing basis and the Bureau maintained close liaison with other services. Construction of a Radiation Exposure Evaluation Laboratory at Bethesda was completed. This laboratory will enable physicians and other scientists to determine the location, amount and kind of radioisotopes retained in the body of individuals who have been exposed to a nuclear incident. Plans have been made for a Biomedical Radiation Research Center at

Bethesda also. In this activity biological matter can be exposed to radiation and the effects studied and recorded. This facility will also provide clinical isotopes for the treatment of patients at naval hospitals.

As a result of the success of the Polaris Missile, the importance of the nuclear powered submarine has greatly increased. In this program the Atomic Energy Commission requires that a radiological health medical officer be attached to each nuclear submarine. This officer must report before the reactor becomes critical and must remain during the post-overhaul shakedown. This is usually a period of 14 months. There are currently nine submarines of the fleet ballistic type under construction and others will probably be authorized in the near future. Each crew must have a medical officer. There is, therefore, a continuing and increasing demand for submarine medical officers in the Navy who are trained in radiobiology or radiological health progress. The most pressing current operational medical problem in nuclear submarines is the development of additional knowledge which can make possible with less difficulty a respirable atmosphere during periods of long submergence. This has been under continuous study aboard the submarines and in the laboratories and great progress has been made in this area and careful studies are being continued.

In our research activities basic research goes on constantly in our in-service work and we profit by our contracts with extramural agencies made by the Bio-Sciences Division of the Office of Naval research. However, at this time, principle attention is given to in-service studies. Here the fundamental studies are closely correlated with operational requirements, and the laboratories and other facilities so situated that they are in direct contact with naval operations. Scientifically, the great Naval Medical Research Institute, a command in the National Naval Medical Center, stands as a focus of our medical research, but we have management or technical control of 15 laboratories in this country and abroad. In these and other facilities we contribute through research to submarine and shipboard medicine, to aviation and space medicine, to the field and amphibious medicine of the Marine Corps, by our clinical investigation to the diagnosis and care of patients, and to the prevention of disease and injury. We are concerned with a wide range of studies from prevention to rehabililitation.

From the wide variety of reports, I select a few, representative of recent achievements. As previously mentioned, in association with the Protein Foundation, the development of long-time preservation of blood is outstanding. Our studies of cholera have defined the physiological aspects of this disease to guide its rational treatment. We have isolated viruses of trachoma and developed a vaccine with promise of success. Virology is an active field, especially as concerns diseases of the respiratory tract, their sequelae and prevention. In the Sudan we have an ongoing program for the study of kala-azar. Also in Egypt we have arranged with Vanderbilt University for learning the importance of nutrition in communicable diseases. We have developed the scientific basis for limb prostheses. Our demonstration of the ex-erythrocytic cycle of the malarial parasite is fundamental. We participate in aerobiology and the preventive aspects of biological warfare. Several of our laboratories for aviation medicine are now being exploited in association with the National Aeronautics and Space Administration. Our Neuropsychiatric Research Unit, centered in San Diego, California, covers various facets in this field in naval problems and otherwise. Many of our hospitals are actively engaged in clinical research and we have established at Oakland, in close association with the University of California, a Clinical Investigation Center, which already has produced significant results in studies of renal function, metabolism of amino acids and etiology of pulmonary emphysema.

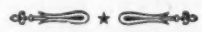
This brief exposition covers only some of our medical research. It illustrates current

activities, but the Navy is equally concerned with potentialities of these and other programs and views its future as holding great promise.

High standards of professional performance have been stimulated in all corps. The benefits in the way of accomplishments and improved morale which can be obtained through superior leadership have been pointed out clearly during the past year. Training in leadership for all officers and petty officers through indoctrination programs and the continuous on-the-job training programs has been increased and will continue to receive attention in the future. Every effort has been made to assign members of each corps to billets for which they are professionally trained and qualified. In this way it has been possible to avoid for the most part the wasting of professional talent. Admittedly, there are the so-called professional "gray" areas in which the services of an officer and his training cannot be fully used. However, the remoteness of the station or the deployment of a vessel may require the continuous presence of one or more Medical Department officers with special qualifications. Such assignments are usually of short duration and are followed by transfer to professionally stimulating facilities. The benefits to the Navy and to the individual by further education is in-service schools and civilian institutions have been pointed out to all hands. There is an increasing interest in these programs and they are being supported and expanded in every possible way insofar as the requirements of service and funds available will permit. It is imperative that we continue advanced education for our personnel so that we can stay abreast of scientific and technical advancement.

These are some of the highlights of our activities. As you can see, we have moved ahead in many areas and I anticipate the next year will be equally as productive. These successes do not represent the efforts of any one segment of the Navy Medical Department, but rather are the results of the overall team work and cooperation of our officers, enlisted men and our civilian employees.

Finally, I would like to point out that we, as well as the Medical Departments of the Army and Air Force are under the overall supervision and direction of the Office of the Assistant Secretary of Defense (Health and Medical). Many of our important advances along with those of the Army and Air Force therefore can be directly or indirectly attributed to the effective administration and coordination of this office. Skillful and knowledgeable direction at the Department of Defense level has prevented unnecessary overlapping of departmental programs and it has resulted in economies in the use of manpower, resources, and money.



LET'S START THE NEW YEAR BY VACCINATING AGAINST POLIO

The Air Force Medical Service*

By
MAJOR GENERAL O. K. NIESS, *The Surgeon General of the U. S. Air Force*

THE success of the Air Force, of our defense effort, and of our nation hinges on the effectiveness of one resource—PEOPLE. In a large measure, the effectiveness of people is a responsibility of military medicine. The theme of this year's program. "The Military Role in Medical Progress," emphasizes our expanding horizons. The science of medicine does not exist today as a separate entity. The aerospace age has stimulated a cooperative effort between medicine and the physical and social sciences. The expanding horizons ally medicine, human welfare programs and engineering sciences where each must support the other toward a common end.

The Air Force Medical Service was established on 1 July 1949 with the mission: *to provide medical support necessary to maintain the highest degree of combat readiness and effectiveness of the Air Force.* Basically this has developed into an unprecedented effort in the practice of preventive medicine and its supporting research, since the prevention of manpower losses from injury and illness in the first step to insure combat readiness and effectiveness in the space age. The operational effectiveness of the United States Air Force during the past year is testament of the caliber of the medical support provided. Less than one (1) per cent of the military population was absent from duty on any one day because of illness.

To support the Air Force mission worldwide, the Air Force Medical Service operates 230 medical facilities. Of these facilities, 11 specialty hospitals in the continental U. S. and one in each major overseas command offer care in 31 medical specialties.

To provide maximum medical support of the Air Force and complete clinical care of the Air Force man and his family, and in the interest of not duplicating facilities or service, we have worked closely with the other services in sharing capabilities. The bonds of understanding in the field of medicine allow productive interservice cooperation.

The growth of medical knowledge and the requirements for higher levels of medical education and training in so many clinical specialties make it necessary that physicians and others engaged in the health sciences be given frequent and stimulating opportunities to improve their knowledge and their skills. The military departments have their own service schools since similar teaching and emphasis do not exist in the civilian community. In addition, numerous fellowship, residency and research laboratory opportunities are sponsored by the military medical departments. It is by such means that we can maintain the high standards of medical care deserved by those in uniform. And through continual education and training we are assured of being professionally prepared for the exacting demand of national defense.

We continue to increase in stature as physicians and specialists in health fields with the growth of our fund of knowledge in science and technology only if this knowledge is translated into service and the practice of good medicine.

During its relatively brief history, Air Force aerospace medical research has had a great impact on general medicine. The Air Force has pioneered in such areas as the cause and effect of stress, fatigue, tension, and other hazards our airmen are expected to encounter in space. In addition, it is influencing the development of medical instrumentation and methods used in diagnosis, observation and therapy. In our experiments in space, all instruments must be

---

* Presented at the Panel of the Chiefs of the Federal Medical Services, 67th Annual Meeting of the Association of Military Surgeons of the United States, Washington, D.C., October 31, 1960.

miniaturized, and carefully selected data must be telemetered back to the earth if the research flight is to have physiological significance. An example of the data which must be telemetered back for analysis would be the rate and depth of respiration, cardiovascular data to include electrocardiograms, oximeter readings to determine the percentage of oxygen saturation of the blood, changes of deep and superficial reflexes, data relative to eye motions and accommodative powers, skin temperatures, and electroencephalographic data. Experiments in these areas are of interest and importance to everyone in medicine as they speed the improvement and miniaturization of many appliances used in diagnostic procedures. It is probable that these telerecording and telemetering devices will be used to send electro-biopotentials of cardiac, respiratory, cerebral and other activity to some centralized hospital or clinic where fair determination of diagnoses and management of difficult cases may be undertaken even though they may be miles away. This is one of the expected benefits to general medical progress.

A great number of the developments of the Space Age have been adapted to military and civilian medical use. For example, a derivative of hydrazine developed as a liquid missile propellant, has been found useful in treating tuberculosis and mental illness. Another missile discovery has been modified to produce a means of rapidly lowering blood temperature to make operations safer. A small efficient valve developed for missiles could replace a defective valve in the human heart. Electronic equipment for space is being adapted to measure body temperature and blood flow. These are only a few of the important contributions to medical progress.

I believe that to the extent that our work is not classified, the public should be apprised of our progress and be made aware of our problems and requirements. Through this means, we are able to report research findings which are helpful to others in related endeavors, seek assistance in the solution of our problems, and further the accomplishments of our common goals.

For many years a nationwide group of eminent civilian physicians and surgeons has been helping to solve the medical problems of the Armed Forces and seeking to forge an ever-closer link between civilian and military medicine in the interest of national defense. Little recognition has been given to their activities, but these men have played an important role in developing and maintaining the high standards of medical care now being provided by the three services. I would like to offer official thanks and gratitude to these dedicated men—our civilian consultants.

I would like to point out too the important role of the Association of Military Surgeons in promoting medical progress. Last year representatives from 28 countries were present at the annual meeting. Following the meeting, these distinguished visitors traveled to Federal medical installations where they were briefed on the latest developments in research and education. They were able to carry back new knowledge to take root in their native soil and thus help all mankind.

The fine esprit de corps that exists in military and civilian medical circles should be an excellent example to all the world that medicine not only can help the sick but can contribute in a marked degree to the peace of the world through its healing art.

Medicine in the U. S. Public Health Service*

By

LEROY E. BURNEY, M.D., *The Surgeon General of the U. S. Public Health Service*

IT IS, as always, a pleasure and a privilege for me to join with my distinguished colleagues from the other Federal services on this occasion. Although they might be difficult to measure objectively and quantitatively, I am certain that great benefits have accrued to all of us, and indirectly to the health of the people we serve, through the annual interchange of ideas and knowledge made possible by the Association of Military Surgeons. Certainly the mutual respect for and reinforcement of our activities in the Federal medical services, fostered by these sessions, are of great value to the Public Health Service and to me personally.

I should like to note, also, the appropriateness of the general theme which has been adopted for this year's meeting. "The Military Role in Medical Progress" has been, for many years, one of great significance in the march toward better health, not only for military populations but for people everywhere. As new health challenges move to the center of the stage, it is obvious that the stature of military medicine will continue to grow.

We in the Public Health Service have been increasingly concerned, during the past few years, with the changing health needs of the American people and the necessity for shifting emphases to meet these needs. In January of this year I asked a group of our ranking officers to devote full time to a study of the mission of the Public Health Service for the coming decade and the organizational structure best calculated to carry out the mission envisioned. As a result of this study, we are presently in process of reorganizing the Service so as to deal as efficiently and effectively as possible with the two major problem areas confronting the health resources of the nation—the problems associated with rendering comprehensive and coordinated services to the chronically ill and aged, and the problems arising from the new chemical and physical environment.

Meanwhile, as you know, the Public Health Service has continued to grow. Our appropriations for fiscal year 1961 are just above one billion dollars—the first time we have reached that magical and rather terrifying figure. By far the largest share of this sum, of course, goes to support extramural research in the form of grants. For several years about three-fourths of the budget of the National Institutes of Health has been spent outside its own plant. This year the proportion devoted to extramural research is almost 85 percent. Overall, the Service received a 23 percent increase in appropriations, while the NIH increase was 37 percent. Throughout this period of transition and growth, we become increasingly concerned with the state of the Nation's health manpower resources. We here in this room, and the Services we represent, are of course in direct competition with each other for personnel. At the same time, the medical services of the Federal government are in competition with a growing number of increasingly attractive avenues which beckon medical graduates and young people in the allied and ancillary health professions.

Meanwhile, the study of medicine itself is facing perhaps its stiffest competition in several generations from other fields of study, especially those in the area of the physical sciences, which can offer greater inducements in the form of scholarship assistance, more rapid attainment of professional status and remuneration, and equal prestige, popular acceptance, and idealistic appeal. The fact that a number of our medical schools are having difficulty filling

---

* Presented at the Panel of Chiefs of the Federal Medical Services, 67th Annual Meeting of the Association of Military Surgeons of the United States, Washington, D.C., October 31, 1960.

their freshman classes and the fact that the average academic quality of those applying for medical education is measureably lower than it was a few years ago furnish sobering evidence that the medical profession cannot afford to rest on its laurels.

At a time of rapidly increasing demand in all areas of medical service—private practice, hospital service, public health, industrial medicine, governmental and military service—we are having serious trouble in maintaining, much less increasing, the quantity and quality of prospective physicians. It seems to me that there is urgent need for all of us to combine our best thinking and planning on this common problem. Any advance in the recruitment of top-quality young people for the medical profession is a gain for us all.

Turning now from the general to the specific, I should like to review briefly with you some developments of the past year in areas of special interest to this group.

As many of you probably know, responsibility for planning and operating the Nation's emergency medical stockpile program has very recently been assumed by the Public Health Service. We feel that this is a significant step in the over-all process of readying our health and medical resources for civil defense. Essentially, the transfer of the medical stockpile helps to link the human capability which is being developed with the physical resources they will apply in time of national emergency.

The transfer of authority involves about $200 million worth of medical supplies and equipment located in 33 warehouses throughout the country. The most notable item involved is the supply of almost 2,000 two hundred (200) bed "packaged" hospitals for civil defense emergency use. About 1,500 of these are now stored at strategic locations in various parts of the country, while others are being used for demonstration and training purposes.

The Public Health Service stockpiling responsibilities, under general policy control of OCDM, will include procurement, maintenance, quality control, distribution and utilization of survival supplies and equipment.

The Medical Education for National Defense program has advanced in the past year, and the program for the coming year is an impressive one. As of October 1, a total of 82 medical schools are participating in the program, with each receiving an annual grant to support its MEND activities.

In October of last year a five-day symposium on Preventive Medicine and Health Mobilization was conducted by the Public Health Service for about 150 Professors of Preventive Medicine and others with educational responsibilities at various schools in the MEND program. The participants visited the Sanitary Engineering Center in Cincinnati, the Communicable Disease Center in Atlanta, our Regional Office in Charlottesville, and several programs here in Washington. They also visited the National Institutes of Health. The purpose of the tour was to introduce these key educators to the operations and programs now under way related to disaster medicine.

On May 26 of this year, Secretary Flemming and Governor Hoegh of OCDM announced that, in a civil defense emergency, the Department of Health, Education, and Welfare would cease to exist in its present form. It would be replaced by an Emergency Health and Welfare Service which would have two subordinate operating agencies—the Emergency Health Service and the Emergency Welfare Service. The Emergency Health Service would include the Public Health Service, the Food and Drug Administration, the Office of Vocational Rehabilitation, and the health personnel from the Children's Bureau, all of these from within our own Department. In addition, the Emergency Health Service is to include the medical program of the Veterans Administration and such other federal health programs as may wish to participate. The implementation of this policy decision, which involves a number of changes from previous plans, is now being worked out.

Turning to another field of increasing interest and concern, the Public Health Service has greatly stepped up its activities in radiological health, in response to the augmented responsibilities given to us in 1959.

Within the past twelve months, three new radiological health laboratories have been dedicated and opened for business—in Las Vegas, Nevada, Montgomery, Alabama, and in nearby Rockville, Maryland. The Las Vegas and Montgomery facilities are conceived primary as regional centers to assist in developing the capability of State health departments and other agencies interested in radiological health. The Rockville laboratory will give principal emphasis to developmental work and training in problems related to use of x-rays.

Since adequate radiation protection for the Nation as a whole is dependent upon well trained people in the field, we are accelerating and expanding our training programs to provide a corps of radiation health specialists. We estimate that at least 4000 additional personnel with specialized training in radiation will be needed by 1970 in Federal, State and local health agencies and in industries, hospitals and universities. The Congress has appropriated $500,000 specifically earmarked for grants to universities for the training of radiation specialists at the graduate level.

Since March we have expanded our milk sampling network from 10 to 59 stations. Nearly every State now has at least one station, making periodic collections of milk to be analyzed for radioactivity. Our surveillance effort also includes sampling of surface water, air, and representative foods. As has been widely reported, the average amounts of radioactivity being encountered in milk, water, air and a variety of foods are well below the levels recommended as safe by various scientific advisory groups.

Among the significant legislative developments of the past session of Congress was the passage of Public Law 86-610, the International Health Research Act of 1960. This Act broadens and strengthens the authority of my office and of the Secretary of Health, Education, and Welfare in establishing and supporting cooperative research activities with investigators and institutions in foreign countries. Significantly, it also authorizes the President to use the foreign currencies which accrue under the Agricultural Trade Development and Assistance Act of 1954 for purposes of international health research.

The net result of this new legislation will be a heightened level of effort in international health research, a field which I consider to be of the highest promise, both for the acquisition of new medical knowledge and for the strengthening of our relationships with other Nations.

Another legislative action worthy of mention was the passage of Public Law 86-415, the Public Health Service Commissioned Corps Act of 1960. The 20-year retirement provision of this Act provides that officers with 20 years actual active service, but less than 30 years, may retire, with the permission of the Secretary. In addition, all reserve officers have been brought under the same retirement system as the Regular Corps, thereby bringing the Public Health Service into a parallel position with that of the other uniformed services in this regard.

In sum, 1960 has been for the Public Health Service a year of growth, of transition, and of continuing diversification of activity. This morning I have touched on only a few of the highlights of this challenging year. I note in the program that a considerable number of my colleagues will be participating in the sessions ahead in this busy week. I know that they look forward as I do, to contributing something and learning much in the process.

Medicine in the Veterans Administration—1960*

By

WILLIAM S. MIDDLETON, M.D., *Chief Medical Director, Veterans Administration, Washington, D.C.*

THE mission of the Department of Medicine and Surgery of the Veterans Administration is to afford "the best available medical service to every worthy American veteran." By the terms of reference of this mandate it behooves the Agency to strengthen its medical and supporting staffs by every educational expedient with the ultimate objective of improved human service. Through consulting and attending services the medical and allied health professions have afforded sustained support to veteran medicine. The Dean's Committee relationship, which has existed since 1946, is the most important contributor to this effort. In an atmosphere of mutual respect it has thrived so that a recent questionnaire found no dissident vote to its continuance on the part of the participating medical faculties. Indeed, in the past year two Deans' Committees have been added to the program, which assures to the American veteran improved service through the supervision of staffing, education and research in 96 of the 170 Veterans Administration hospitals. The physician-in-residence program, which has been placed on a more formal basis in recent years, affords professional stimulation and guidance to the staffs of the peripheral hospitals of the system by the assignment of a physician of national stature for periods of three to five days. Such selected physicians enter into the professional activities of the sponsoring station in rounds, clinical conferences, and occasional lectures. To broaden the base of this influence, staff members of neighboring peripheral hospitals may be detailed for temporary duty to the sponsoring institution. Not infrequently the physicians of the community avail themselves of these unusual opportunities for professional improvement. In a parallel pattern, physicians with teaching ability in the Veterans Administration are given similar assignments at removed stations.

The utilization of the clinical facilities of the Veterans Administration in the graduate education of residents gave point to the participation of the staffs of the medical schools in the Dean's Committee relationship in the immediate post-World War II period. At that time this form of professional improvement for the vast numbers of medical officers relieved from medical service in the Armed Forces was at a high premium. There has been a resurgence of activity in this area in the recent past. Furthermore, the rapport established through the years of mutual effort in the interest of superior medical service to the American veterans has led to the extension of the educational interchange to the undergraduate years. At the present time over half of the graduates from the medical schools of this country will have had some period of clinical clerkships in Veterans Administration hospitals.

The letter of President Eisenhower to the Congress, February 26, 1959, establishing an authorized level of 125,000 beds in Veterans Administration hospitals, spelled a new day in veteran medicine. By the terms of the President's communication, the Administrator of Veterans Affairs for the first time was given complete latitude of action in placing such beds according to geographic and functional needs. Careful staff studies had established the areas of unusual population pressure and had predicted the impact of such forces on the requirement for hospital beds for the next twenty-five years. By the terms of the President's communication, the Administrator, while held under the ceiling of 125,000 beds, was given full authority to adjust these beds in hospitals of the system to such veteran population demands. Furthermore, instead of losing beds that were no longer needed in certain diagnostic categories, he was enabled to redesignate beds,

* Presented at the 67th Annual Meeting of the Association of Military Surgeons of the United States, Mayflower Hotel, Washington, D.C., October 31-November 2, 1960.

wards, units or hospitals to meet the medical needs of the area. For example, with the decreasing requirement for beds for the tuberculous veterans, two hospitals have been closed and the designation of nine more has been changed from tuberculosis to general medical, surgical and neurologic. Of the original 21 tuberculosis hospitals there now remain 10 so designated.

The long-term planning of the Veterans Administration has emphasized the necessity for the physical rehabilitation and replacement of obsolescent hospitals. This plan presently involves hospitals constructed before World War II. Many of these are temporary structures transferred from the Armed Services to the Veterans Administration to accommodate the overwhelming load of returning sick and disabled veterans from World War II. To meet this pressing need the sum of nine hundred million dollars will be required over the next twelve years. On the recommendation of the President the first appropriation of seventy-five million dollars was voted at the last session of Congress. A twelve-year program at this level will meet this immediate crisis. At the same time, the Veterans Administration is availing itself of this opportunity to obtain the best current guidance as to hospital organization and construction through the advice of consultants. Furthermore, its own thinking is undergoing radical changes. With the experience of a diminishing requirement in tuberculosis, units for the treatment of chronic non-tuberculous pulmonary diseases have been incorporated in planning of Veterans Administration hospitals for a number of years. Presently, two points of view are being reflected in the planning for care of the psychiatric patients. In the first place, the large psychiatric hospital with its dormitories is a relic of the past. Even the presently projected 1000-bed hospitals for the mentally ill appear unwieldly. Secondly, psychiatric units are being planned for general medical, surgical and neurological hospitals. Conversely units of medical, surgical and neurologic beds are being incorporated in psychiatric hospitals. The early passing of special hospitals can be foreseen and the future in the Veterans Administration system will unquestionably witness the evolution of a hospital complex incorporating the several essential elements in a cohesive, well coordinated whole.

Beyond a question of doubt the lessons learned in the cooperative study of the chemotherapy of tuberculosis by the Armed Forces and the Veterans Administration contributed immeasurably to this trend. From a high point of 15,960 tuberculous patients in the Veterans Administration hospitals in 1954 a level of 9,037 was reached this year. The decline has been approximately 8 per cent per year. While it runs against grain to resolve such an advance in terms of monetary gain, at the cost of three million dollars for research in this area in the Veterans Administration, the decline in the requirement for beds for tuberculous patients of the stated magnitude represented a gain of over a hundred million dollars in hospitalization alone. The average length of stay has declined from 325 days to 267 days. From staff studies of the experience for the past five years, based on the age—specific hospitalization rates per one hundred thousand living veterans, it is predicted that the demand for beds for non-tuberculous respiratory diseases will approximately balance the continuing decline in tuberculosis.

The outstanding success of the cooperative study of the chemotherapy of tuberculosis led naturally to the application of parallel techniques in other fields. Presently, there are 28 cooperative studies in progress in the Veterans Administration. In 1956 a large scale cooperative study in the evaluation of the effectiveness of tranquilizers and psychic energizers in psychiatric patients was launched. The direct and indirect dividends of these studies are reflected in the resurgence of interest and the improvement of care of the psychotic patients. The monthly turnover rate for this category of patients has increased from 5.8 per cent to 6.5 per cent in the past 5 years. Trial visits have grown apace. As a measure of community acceptance the foster home program has had a new lease on life. The newest device in resocialization, the Day Care

Center, is meeting with gratifying success. The waiting list for psychiatric care has declined 1,162 in the past year. Needless to say each bit and piece added to the therapeutic melange for the mentally ill must share in the creditable record of the recent past. Certainly the advances in chemotherapy have played an important role, but they are adjuvants not cures. The spate of antihypertensive drugs invited their cooperative study. Working under a carefully conceived protocol, studies are being conducted in seven Veterans Administration hospitals. The double blind-control techniques have already afforded important results. Reserpine alone has apparently little, if any, independent antihypertensive value. Combined with hydralazine, reserpine gave satisfactory results. The ganglionic blocking agents, mecamylamine, chlorisondamine and pentolinium gave parallel reductions of blood pressure. The side effects of the last named group of drugs limited their uses in some instances.

To attach appropriate values to the more than six thousand individual research projects in the Veterans Administration, Department of Medicine and Surgery, would require the wisdom of Solomon. In noting certain significant contributions, while Procrustean techniques may be suspected, there is no design to place relative values either on the cited or the uncited works. Doctor Ludwik Gross's studies on the experimental production of leukemia in mice have been extended to observations on the moderating influence of thymectomy. When the thymus is removed prior to the challenge of mice with the infective material, lymphocytic leukemia does not occur. The immunochemical assay of the plasma level of insulin by Doctors Yalow and Berson is one of the most meticulous techniques evolved in a complicated field. The method is sensitive to less than 1 microunit of insulin. The suggestion of a relationship of pine pollen to sarcoidosis by Doctor Martin M. Cummings has stimulated extensive studies in this area. So the list of significant contributions to the advance of medicine through the research program in the Veterans Administration might be extended.

Automation is here to stay and it behooves the medical profession to adapt itself to the newer and more sophisticated techniques and at the same time to maintain the humanitarian motivation of the past. From the use of automatic devices to move food, supplies and records we pass to the autoanalyzer and electronic devices for cell counts in the laboratory to telemetering of temperature, pulse, respiration and blood pressure in the patient at the bedside. And these are just the beginnings of the inevitable movement. At the Mount Alto Veterans Administration Hospital, Doctor Ubert Pipberger and Doctor Edward D. Freis have transferred the electrocardiographic signals in analog form to a magnetic tape. In turn these signals are converted to digital form for automatic analysis by an electronic computer. This pathfinding expedition will undoubtedly bring great immediate rewards and further dividends in wider areas in the future. In 1959 a nuclear reactor was installed at the Veterans Administration Hospital, Omaha. Doctor Richard E. Ogborn has utilized this tool in the production of radioisotopes for the analysis of trace elements in body fluids and tissues. To meet the requirements for mathematical calculations an IBM Model 1620 is being installed at this station to keep pace with the output of the nuclear reactor. At the Veterans Administration Hospitals, Boston and Los Angeles, total body counters are being employed to establish the actual hazard of exposure to radiation.

So medicine moves forward. You will recall that Alice complained of the pace the Queen was setting and said, "Well in *our* country you'd generally get to somewhere else—if you ran very fast for a long time, as we've been doing." "A slow sort of country!" said the Queen. "Now *here,* you see, it takes all the running *you* can do, to keep in the same place. If you want to get somewhere else, you must run at least twice as fast as that!"

If medicine is to maintain its place in modern science and society, we must accelerate our pace as the Queen advised Alice.

Aging and Medical Progress Through Research*

By

THE HONORABLE JOHN E. FOGARTY, *Member of Congress, Second District, Rhode Island*

IT IS particularly gratifying to me that this association of distinguished military medical men should call upon me to speak on the general subject of aging and research. I am well aware that the problem of aging is not one of primary concern to the military services. Your medical research programs are quite properly oriented toward other problems, such as preventive medicine, psychophysiology, surgery and shock, and the protection of the fighting man from the hazards of a war-time environment. It is your concentration on research in these areas that has made today's fighting men the healthiest in our history, and has enabled the military medical services to achieve such a splendid record in your assigned mission, "to conserve the fighting strength."

Yet, just as you, in the course of your researches, have made contributions to civilian health and medicine which have benefited all mankind, so investigators in aging research may produce results that could have far-reaching implications for us all. I note that your organization also includes members of the staffs of the Veterans Administration and the U. S. Public Health Service. Both of these organizations are deeply concerned with problems of aging and are focusing major research efforts on these problems.

Others of you are reserve officers and National Guardsmen and you, too, are concerned with problems of aging.

It has been a rewarding experience for me over the years to be in a position to be able to support and to expedite a considerable amount of legislation which has helped to improve the health, welfare, income, and housing of our older citizens. But we have never done enough; we have never attacked the problem as strongly as we must; and so, a couple of years ago I introduced a bill calling for a White House Conference on Aging in an attempt to put the spotlight on this increasingly difficult national problem. The Act was passed by Congress and signed into law in September 1958, and provided for the convening of the Conference in January 1961.

THE WHITE HOUSE CONFERENCE ON AGING

I must confess that I am proud to have played a leading role in the passage of this bill calling for a White House Conference on Aging. The Conference, as I am sure you know, takes place here in Washington in January. I think the Conference may be one of the most significant in the history of this nation—socially, economically and medically.

I would like to re-state here some of the purposes of the Conference, with you bearing in mind that the policy of the Congress is that the Federal Government will work jointly with the states and their citizens to promote a better life for our older people, the emphasis always to be on the right and obligation to free choice and self-help in planning their own futures.

Here is a declaration of purpose as stated in the Act:

(1) assuring middle-aged and older persons equal opportunity with others to engage in gainful employment which they are capable of performing, thereby gaining for our economy the benefits of their skills, experience, and productive capacities; and

(2) enabling retired persons to enjoy incomes sufficient for health and for participation in family and community life as self-respecting citizens; and

(3) providing housing suited to the needs of older persons and at prices they can afford to pay; and

(4) assisting middle-aged and older persons to make the preparation, develop skills and interests, and find social contacts which will make the gift of added years of life a

---

* **The Sustaining Membership Lecture** presented on November 1, 1960 during the 67th Annual Meeting of the Association of Military Surgeons of the United States held in Washington, D.C. Note: For list of the Sustaining Members see this journal.

period of reward and satisfaction and avoid unnecessary social costs of premature deterioration and disability; and

(5) stepping up research designed to relieve old age of its burdens of sickness, mental breakdown, and social ostracism.

Why More Research in Aging?

Why do we need more research in problems of aging? It is commonly said that the average life expectancy at birth has increased from 50 years in 1900 to 70 years today—a gain of 20 years. As you know better than I, this spectacular advance of the first half of this century has come about through the conquest of most of the communicable diseases and from a great decrease in infant mortality. Of course, this audience is also well aware that this increase in the number of people living to an older age has not been paralleled by a comparable increase in *total* life expectancy. Between 1900 and today only about two years have been added to the lives of those reaching 60 or 70 years of age. This means essentially three things: (1) at this time there seems little prospect of increasing total life expectancy—we are not going to be able to live forever—and (2) medical research is shifting its emphasis into investigations of the chronic, metabolic and degenerative diseases, and cancer.

Medical Problems of the Aged More Pressing

It also means something else. It means a wholly new challenge confronts us: how shall we deal with a staggering increase in the number of our older citizens? Sixty years ago the number of people over age 65 was less than 4 million; in 1950, the number was 12 million; and it is estimated that by 1970—just a short decade away—the number of people over 65 will probably exceed 18 million. I repeat: this is a challenge—a challenge to our culture and to our consciences.

We must find new and better ways to handle the community, family and personal burdens imposed by ill health on older people, to enable this considerable portion of the population to lead fuller, active lives. unblighted by economic and disease problems. We must learn as rapidly as possible a great deal more about the disease of these older people, about the people themselves, and about their main causes of death: cardiovascular disease and cancer. We must learn all these things quickly, for in the meantime we are gaining every year some 350,000 persons in the age group 65 and over.

Sociological Aspects of Aging

Unfortunately, these aging individuals require more and more community services, because their economic status is such that it is frequently impossible for them to provide for their own needs, and because a great many of their needs can only be met by bringing the resources of the community to support them in some special way. These sociological aspects of aging have many facets.

I am thinking of rehabilitation during and after illness. I am thinking of community nursing, of prepared hot meals delivered to their rooms, and of other such services designed to tide them over in times of crisis. I am thinking, too, of hospital-based or other organized home care programs, and of high-quality nursing home services.

All these community service problems are made vastly more difficult by the change in this country from a largely agrarian population (about 40 percent urban in 1900) to a highly urbanized population (64 percent urban in 1950.) Urbanization inevitably resulted in a more complex social structure most advantageous to the young.

Apartment house living and small-house suburbia have robbed the older people of their traditional roles in our society. The elder members of a rural community are always wanted, and are useful members of that society. They enjoy prestige as is their right, speaking as they do from long experience. But no longer is their experience thought to be so valuable, and, too frequently, they find that what is sometimes called "the Golden Years" are tarnished by the

realization that society no longer has a role for them to play—that they are useless to it, and, consequently, to themselves. Yet this urban world holds more than 64 percent of our citizens over 65, though it is not geared to satisfy even their minimal needs.

Here, as in the biological and medical fields, much needs to be done in research into this problem, before we get any helpful answers.

A Healthier Life Through Research

Medical research is not merely interested in prolonging life. It seeks no Fountain of Youth. It is concerned with increasing and maintaining the functioning efficiency of mind and body into advanced years. It wants to make possible for the older person a happy life as a member of society. It wants to understand the cause and the course of diseases which reduce a person's power to think, feel and respond.

This was what we had in mind when we drafted the White House Conference on Aging Act, especially the fifth provision of the bill. Let me repeat that provision, to refresh your memory:

"Stepping up research designed to relieve old age of its burdens of sickness, mental breakdown, and social ostracism."

As old age creeps up on all of us before we know it, so the problems of the aged overtook our society almost overnight, and caught us completely unprepared. Systematic research in the problem of aging is an almost incredibly recent development, in these United States, and I would like to recount it briefly for you here.

Systematic Research in Aging

The chief Federal program supporting aging research, which we in Congress have worked to strengthen to meet our increasing needs, is found in the Public Health Service's National Institutes of Health. NIH first established a Laboratory for the study of gerontology at the Baltimore City Hospitals in 1940—just 20 years ago. In 1948 the Laboratory became the Gerontology Branch of the new National Heart Institute, the city of Baltimore continuing to provide space and clinical beds for the Laboratory.

In 1955, the NIH presented the problem of aging to the National Advisory Health Council, which is made up of non-Federal experts from the fields of medicine, biology and public affairs, with ex-officio members from the Department of Defense, Veterans Administration and the Army Surgeon General's Office. As a result NIH established a Center for Aging Research late in 1956, for the purpose of planning, coordinating and fostering additional aging research. This Center stimulates and assists gerontology projects in universities, medical centers and medical research institutions in this country, and to a lesser extent, abroad. The Center works closely with other groups, and agencies in research in aging, and has provided invaluable assistance to the White House Conference on Aging called for in my White House Conference Act I mentioned a while ago.

The NIH has pioneered in research in aging, but it is interesting to note that the great bulk of its research is being carried out through grant projects (now some 600 in number) to the Nation's universities, medical schools and other private scientific institutions.

It is also interesting to note in passing that among these many research projects are four comprehensive, multi-disciplinary studies in aging at four separate medical research institutions—Duke University, the Albert Einstein College of Medicine, Western Reserve, and the University of Miami School of Medicine. In these programs the grant funds are managed by special committees made up of representatives of different disciplines and departments, and the resultant cross-fertilization of research endeavors helps the product of research to be greater than the sum of its parts.

At Duke, research is oriented toward the psychiatric, physiologic and social sciences; at the Albert Einstein College of Medicine, it focuses heavily on metabolic changes as a result of age. At Western Reserve, principal attention is given to chronic disease

and rehabilitation; and at the University of Miami the program is entirely basic in its approach to the problem of aging, combining such studies as anatomy, physiology, biochemistry, microbiology and related sciences.

Three Broad Areas of Research

The sheer scope of the research program in aging is to me, a layman, both fascinating and overpowering. Three broad areas are embraced by this research:

(1) the behavioral and social sciences, to bring more work to bear on the mental health problems of older people;

(2) the clinical sciences, to help overcome the diseases that so often descend on the aged; and

(3) the biological sciences, to answer very basic questions relating to the exact nature of the biological processes of aging and their relationship to disease.

Let me illustrate these three areas with an example of each:

In the behavioral and social sciences, there has been in recent years a clear demonstration that the application of intensive rehabilitation will greatly reduce the disability resulting from common infirmities. We do not yet have an idea of the number of older people who can be benefited by rehabilitation techniques, or of the kind and amount of rehabilitation needed, but initial results are encouraging.

In the clinical sciences, it has been learned that high blood pressure may be necessary to normal brain activity in some older persons, and not necessarily always an evil concomitant of aging. The higher blood pressure may be helpful in maintaining normal intellectual functions by overcoming the resistance to blood flow that regularly builds up in the tissues with age and with arteriosclerosis.

In the biological sciences, an investigator working in the biochemistry of aging has found that the "juvenile" hormone of insects exists in the human tissue. This hormone controls the development of insects by governing the timing of growth from cocoon into maturity. If this hormone is injected into certain insects it generally keeps them in the juvenile state—thus lengthening the life span by slowing down the onset of maturity. It may be that the survival of this hormone in man is nothing more than a biological curiosity, but *if* it should turn out that it has some control over the rate of aging in man as it does in insects, then this would be a tremendously important discovery indeed.

Aging Research of Military Interest

Some of the work that is underway in aging research should be of particular interest to you, as it may cast some light on certain research fields in which the military medical effort is concentrated. Internal medicine, with metabolism and nutrition, is one such area. Aging research has at least two interesting developments in this area:

(1) a few years ago most physicians were content to attribute atherosclerosis to the aging process. Now it is a metabolic disorder, not necessarily related to aging but to hereditary determinants and to a host of other influences, and,

(2) one of the most hopeful contributions of gerontology has been the determination that aging is not necessarily associated with disease and deterioration. Old people who receive adequate protein, calcium and Vitamin D still form new tissues and replace calcium in their bones.

Another important area of military medical research interest is in the investigation of the effects of ionizing radiation. For some of you here today it must have been intriguing to note that it has been found in aging research that exposure to ionizing radiation may increase, rather than decrease, the life span of the fruit fly, contrary to what might have been anticipated from somatic mutation theories of aging.

But I do not want to over-stress research results in aging which are of special interest to the military medical researcher. I do not need to caution this audience that none of these results offers any immediate, spectacular solution to the aging process. No one knows how much more research may be needed before we can hope to see a clinical application of anything so far learned in this

newly opened research area. But I think it is clear to all of us that the future is as limitless as man's imagination.

The magnitude of research in aging is no less impressive than its rate of growth. The number of research and training grants administered by the NIH as of January 1958 was 274, at a total cost of about $4,500,000. A year later, the total number of grants had increased to 404, and the cost had increased to $7,600,000. As of today, total grants have increased to more than 600, and the number is increasing monthly, and the total amount in aging research this year will be about $15 million.

I believe that this burgeoning grant activity represents an increased awareness on the part of the scientific world of the problems of aging. And I hope and believe that this increased interest on the part of medical and biologic scientists is part of the groundswell of public interest which has following the passage of my White House Conference bill in 1958.

Public Response to the White House Conference Act

I believe that the call for a White House Conference on Aging is stirring up the action we need. Since its passage, people all over the country have come to see that there is a problem, national in proportions and all-embracing in its implications; and they have been moved to do something about it.

Local, state and national committees have worked hard, in preparation for the Conference to be held here in January. The Secretary of Health, Education and Welfare, who was assigned the responsibility for organizing and conducting the Conference, was swamped with offers of help and with requests for information as to how groups could start mobilizing their own resources.

And let me pay special tribute to the many national groups who got behind the cause. For example, the National Committee on the Aging of the National Social Welfare Assembly named a liaison committee to work with the Department of Health, Education and Welfare, and the American Public Welfare Association named a similar committee. The National Tuberculosis Association urged its state and local affiliates to participate to the fullest possible extent in preparations for the Conference. The Joint Council to Improve the Health Care of the Aged has worked long and hard to make the Conference a success. The National Council of Churches sent circulars to all the local councils, and the 40 affiliated denominations were urged to offer their total resources in helping establish stronger state and local programs and to take part in the White House Conference planning.

And, of course, we had the unstinting cooperation of the Joint Council to Improve the Health Care of the Aged, established by the American Medical Association, the American Hospital Association, the American Nursing Home Association, and the American Dental Association.

Every state, Puerto Rico, the Virgin Islands and the District of Columbia will be participating in the Conference. All the states and territories have held their own conferences, and from these conferences have come recommendations and factual reports. These recommendations have been collated and will be used as a basis for discussion at the White House Conference, as will 20 background papers prepared by the planning committee of the Conference.

Each state has a Governor's designee, working especially with the Conference; and there are nine regional representatives for aging in the United States from the Department of Health, Education and Welfare.

There will be 2,800 official Conference delegates, 1,747 of whom are from the states and territories and 660 of whom are from national voluntary organizations.

The mounting public interest in the subject of aging and in the Conference is reflected in the hundreds of community forums on aging which have been held in all the states. It is reflected in the hundreds of state, regional and local surveys made, and in the dozens of newsletters on aging now being published in the states. It is reflected in the actions of the national organizations—religious, civic, fraternal, union,

business and professional—to inform the general public, through their millions of members, of the problems of aging and of the actions being taken to solve them.

Toward a Brighter Future

On April 9, 1961, a final report on the White House Conference must be made to the President. The report will delineate the findings and set forth the recommendations of the Conference.

It is hoped that as a result of the White House Conference on Aging each group and community represented will put the Conference recommendations into immediate action, that concrete efforts will be made all-over the United States, and that the American People will be brought to realize the implications of aging, both for themselves and for others.

In short, the White House Conference is a four-day gathering which aims to do two things:

To identify and define all of the varied problems confronting the nation's older people, and

To recommend actions that will meet these problems—actions that can be taken by the communities, states, the Federal Government, private organizations and by the older people themselves.

It should not be forgotten that this Conference cannot take direct, specific implementing action to meet specific problems of aging. Such action can only be taken by the communities, states, the Federal Government, private organizations, and by the older people themselves.

This makes it clear and imperative that the actions carried on by the communities, states and private organizations *before and after* the three-day Conference are the heart of the meeting. These decentralized activities taken together constitute a continuing national effort.

Thus, in a large sense, the White House Conference is a national program. It is a citizen's attack on the many fronts of a vital national problem. It will be necessary for every one of us to back the attack, if this nation is to gain the benefits that can come from a successful assault on the forces of disease and adversity that today so often conquer and torture our older citizens.

I am not unmindful of the fact that your organization is made up of regular members and sustaining members. Among the latter are many of the distinguished companies engaged in a vast research effort to find major new therapeutic tools and instruments to conquer man's ills and prolong his life into a more comfortable and happy old age. The development by the pharmaceutical industry of many outstanding drugs such as those used for treatment of mental illness, the newer diuretic agents, the oral antidiabetics and new synthetic penicillins added to the host of broad spectrum and special spectrum antibiotics among many others, attest the success of the industry here and abroad in making major contributions to man's health. In fact, these new drugs place us in a position to be healthier than we have ever been before, be we military or civilian, young or old.

Research and its accomplishments are the combined results of the team effort of Government and private citizens and of industry and non-industrial groups.

I have tried to give you background and details of the forthcoming White House Conference and its purpose and goals. I have tried today to sharpen your awareness of research in aging—research which is vitally important to all of us and yet is necessarily excluded from your military medical research program. I have tried to give you some idea of the sweep and scope of this research—to show how it is concerned with all the phenomena of life, from the cell and tissue to psychological and social conditions.

These studies are very basic, but they may—if and when they come to the stage of application—help make the future brighter for us, as we grow older. And surely these research results—along with the results you achieve in your laboratories and those achieved in the laboratories of science everywhere—these results are added day by day to the ever-growing treasure house of knowledge.

Review of the Activities of the Commission on Epidemiological Survey

By
THEODORE E. WOODWARD, B.S., M.D., D.Sc.*
COLONEL WILLIAM D. TIGERTT, MC, *U.S. Army*†

In this issue of MILITARY MEDICINE begins a series of reports describing the recent work of the Armed Forces Epidemiological Board (AFEB). The current work of the AFEB's Commissions on Acute Respiratory Diseases, Influenza, and Viral Infections already have been published in the 1960 October, November, and December issues, respectively, of the Armed Forces Medical Journal. In view of the discontinuance of the latter publication, succeeding issues of MILITARY MEDICINE will review the research of one or the other of the AFEB's twelve (12) Commissions for the benefit of the medical officers and other medical personnel of the three military services, as well as for all other readers of this publication. The report in this issue, by Dr. Theodore E. Woodward, Professor of Medicine at the University of Maryland School of Medicine, and Colonel William D. Tigertt, Medical Corps, U. S. Army, review the 1959-1960 research activities of the Commission on Epidemiological Survey. Dr. Woodward is Director of the Commission and Colonel Tigertt is Head of the Walter Reed Army Medical Unit, Fort Detrick, Md.

The consultative and operational relationships of the Board and its Commissions with the military medical services were described in last month's issue of MILITARY MEDICINE by Colonel John Rizzolo, USAF (MC), the Executive Secretary of the AFEB. Colonel Rizzolo also reviewed the research in preventive medicine accomplished between 1956 and 1959, sponsored by the Armed Forces Epidemiological Board, most of it supported by the Army Surgeon General through his Medical Research and Development Command.

So that its readers may be fully aware of the activities of the AFEB, from time to time throughout the year, MILITARY MEDICINE also will publish original articles on research in progress and on scientific accomplishments sponsored by the Board or abstracts of articles to be published elsewhere. (Two such abstracts of articles appearing in current issues of other medical journals are published in this issue.) Thus, through this publication—an excellent medium for the dissemination of military medical knowledge—a vast and constantly growing store of information of vital importance to military medicine will become immediately accessible.

It is our aim and hope that by means of such reports, articles, and abstracts, members of the military medical services will be provided with current knowledge about major medical problems and about the contributions that the Board and its Commissions are making toward their solution.

GUSTAVE J. DAMMIN, M.D.
Professor of Pathology, Harvard Medical School
Pathologist-in-Chief, Peter Bent
Brigham Hospital, Boston, Mass.
President, Armed Forces Epidemiological Board

DURING the past year considerable progress has been made on the evaluation of a viable vaccine for the modification and prevention of respiratory tularemia. You will recall that a vaccine of this type has been used in Russia for a number of years and that the product we have had under study is derived from their vaccine. Using a similar vaccine prepared by Fort Detrick workers, volunteers were immunized in mid-1958. At the same time, volunteers were immunized with an antigen for tularemia prepared by Doctor Larson of the United States Public Health Service. Subsequent tests for the immunologic response using the agar diffusion technique revealed that the Larson antigen had evoked no measurable response. A year after the

* Department of Medicine, School of Medicine, University of Maryland, Baltimore, Md.
† Head of the Walter Reed Army Medical Unit, Biological Warfare Laboratories, Fort Detrick, Md.

original vaccination these men were given a "booster" dose of the killed product. Those who had received the viable vaccine were not re-immunized.

Both groups of vaccinates and suitable controls were challenged by the respiratory route with fully virulent aerosols of *Pasteurella tularensis* using inhaled doses ranging from 250 to 25,000 organisms. This latter dose is sufficient to reduce the incubation period in controls to about 56 hours, in contrast to an incubation period of 5-6 days at doses of 10-20 organisms. Chloramphenicol was used for treatment in these studies, since there is a background of therapeutic experience with streptomycin and oxytetracycline.

First, the Larson antigen. At an inhaled dose of 250 cells $\frac{2}{6}$ vaccinates became ill and two of these required treatment. At 1500 cells all vaccinates became ill and two required drug to control the disease. After five days of drug, which promptly controlled the immediate symptoms, certain subjects relapsed and the rate of relapse did not appear to be modified by the prior vaccination procedure.

The results of challenge of those men who had received the viable vaccine a year earlier were markedly different. At a 350 cell challenge only $\frac{1}{6}$ showed any clinical signs of disease and this was a brief febrile episode which terminated spontaneously. Using 1500 cells $\frac{2}{5}$ men showed a similar picture and again no antibiotic was needed. With a 25,000 challenge, all three vaccinates showed a 2-3 day illness and in one the picture warranted specific treatment. He did not relapse after five days of drug.

The viable vaccine is completely acceptable in so far as we now know. The reaction following intradermal vaccination is similar to that of primary vaccinia. More than 800 individuals have received this vaccine without any lost time.

Work is now in progress to formulate minimum standards for this vaccine. It appears that Russian scientists have prepared a very useful and reliable immunizing product. In the next few months we may initiate studies to ascertain the effectiveness of this attenuated strain when administered by the respiratory route. Perhaps such investigations are unwarranted in view of the efficacy and ease of immunization by the intradermal route.

In the virus field brief mention should be made of the expanded use of a killed Rift Valley fever vaccine prepared in monkey kidney tissue culture. It has been shown that a formalinized neurotropic adapted strain is safe for human use. A similar product has now been prepared from the viscerotropic strain and in animals this seems to afford more protection. It was employed in man and no untoward results were noted in approximately 80 laboratory workers. Serologic evaluation is still underway but preliminary results suggest that three doses will provoke a measurable serologic response in a high percentage of humans.

Another approach has been adopted in developing an immunizing agent for the virus of Venezuelan equine encephalomyelitis. There is adequate data to indicate that a safely killed formalinized vaccine for this virus affords only minimal protection. Consequently, the well-characterized Trinidad VEE strain was further attenuated by repeated passage in guinea pig heart explants. By the fiftieth passage this strain had completely lost its ability to kill mice by peripheral inoculation, failed to elicit a febrile response in monkeys, only rarely killed guinea pigs, and produced only a short low grade febrile response in burros. In contrast the parent strain regularly killed all mice, all guinea pigs, about half of the burros, and regularly produced a biphasic febrile response in monkeys. All animals given the attenuated strain and subsequently challenged with the parent Trinidad were solidly protected. Testing has been enhanced by the acquisition of another VEE strain from Colombia which regularly produces encephalitis and death in monkeys. The tissue culture adapted virus protects solidly against this Colombian isolate. Studies of this "vaccine" strain are now underway in man to determine whether it has been sufficiently modified to be acceptable.

A program for appraisal of the efficacy of

typhoid vaccine has been initiated. A total of eleven volunteers have received viable *Salmonella typhosa.* Following the oral administration of typhoid bacilli the clinical illness, characteristic in all aspects, has been produced. One of the early signs indicative of infection is the presence of bacteremia which is noted prior to the development of active clinical signs. The clinical illness has been controlled readily. The immediate objective is to determine an approximate ID 50 as a preliminary to the vaccine trials. Studies pertaining to physiologic, immunologic, metabolic, biochemical and other abnormalities are contemplated and underway.

In this report, end-items such as vaccine or chemotherapeutic agents have been emphasized. It is obvious, however, that in any such studies careful observations must be made to ascertain and clarify the pathogenesis of these several diseases. Elucidation of the mechanisms of disease is a fundamental charge of this Commission. Similarly, efforts, with some success, are being conducted to shorten the time required for the recognition of diseases. In our next report, we will deal more fully with some of those aspects of the pathogenesis and mechanisms operative in the several disease entities under examination.

FEDERAL NURSING SERVICE AWARD

Announcement is made of the Second Annual Federal Nursing Service Award to be presented during the 68th Annual Meeting of the Association of Military Surgeons, November 6, 7, and 8, 1961.

The Award, consisting of a $500 honorarium and scroll, will be presented to the nurse in the Federal Nursing Services who submits an essay which reports the most beneficial study of or contribution to professional nursing in any area of practice. Announcement of the winner will be made in the fall of 1961.

The subject material of the essay may be the result of the study or actual experience or a combination of both. Essays of from 3,000 to 10,000 words must be submitted in six copies, double spaced, typed on standard size paper with the name of the author omitted, but a *nom de plume* substituted. An accompanying sealed envelope must be submitted with the title of the essay and *nom de plume* on the outside and a sheet of paper bearing the title of the essay, the *nom de plume,* and the true name and address of the author enclosed.

The envelope containing the material must bear a postmark no later than June 15, 1961, and be sent to the Secretary, Association of Military Surgeons, 1726 Eye St., N.W., Washington 6, D.C.

THE 1960 WELLCOME PRIZE ESSAY

The Medical Aspects of Closed Cabin Atmosphere Control

By
COMMANDER JOHN H. SCHULTE, MC, *U. S. Navy**

INTRODUCTION

THE recent advances in the field of rocket propulsion are rapidly leading us into the era of space travel. Foresighted members of the medical profession have realized that closed cabin atmosphere control will be one of the more important, if not the most important, of the medical problems to be faced by the space traveler. Foremost among this group of doctors who are looking ahead are the military medical men, especially the flight surgeons of the Air Force and the Navy. They are fully aware that the satisfactory control of the atmosphere will be essential to the success of every space flight.

Closed cabin atmosphere control is not a new medical problem, however. It began with the development of the first submarine and has increased progressively in complexity and importance as submarine technology advanced. And, although the means of controlling the atmosphere may differ greatly, the basic requirements are the same whether the enclosed cabin is a submarine or an interplanetary passenger rocket ship. It behooves us, therefore to obtain as much basic information and practical experience as possible from submarine operations and research projects so that this knowledge may be applied to the space ship as it is developed.

The replacement of air breathing diesel engines with a nuclear reactor has eliminated the need for a submarine to surface or snorkel (which is in reality a modified form of surfacing) to recharge storage batteries for submerged propulsion. Since the fissioning of uranium is an anaerobic process, it is just as convenient to utilize the heat obtained from controlled fission to operate a steam engine and make electricity while submerged as it is on the surface of the ocean. Therefore, if the needs of the crew can be satisfied, a nuclear powered submarine can remain submerged for a year or more until reactor refueling becomes necessary. Thus we have a closed cabin atmosphere control problem on nuclear submarines identical with that which can be foreseen in future space travel.

Whether we speculate about the future space ship or consider the present operational nuclear submarine we realize immediately that it is necessary to add oxygen and remove carbon dioxide continuously to maintain an atmosphere which will satisfy the physiological needs of the personnel on board. This is not sufficient, however. Previous submarine experience has shown that there is a slow accumulation of other impurities in the atmosphere. Piatt, Ramskill and White[1] reviewed all the current literature. From this review and their own studies they have compiled a list of 33 other substances which are known to exist in a submarine's atmosphere and an additional 26 substances which are suspected to be present. Whenever one of these atmospheric constituents has been identified, it then becomes necessary to discover its source and determine its rate of increase

* Commander Schulte is now on a Fellowship in Industrial Medicine, School of Industrial Medicine, University of Cincinnati, Cincinnati, Ohio. He is a native of Cincinnati, Ohio, obtained his pre-medical education at Xavier University in Cincinnati, and his medical education at the College of Medicine, University of Cincinnati. He entered the Navy following graduation in 1948, and upon his own request has been detailed to submarine duty, which has included duty on the nuclear powered submarines, USS *Sargo* and USS *Halibut*. He has also been an instructor at the School of Submarine Medicine, New London, Conn.

and establish its relative toxicity. Any substance which is found to reach toxic levels must then be controlled either by removal of the cause of generation at its source or by some chemical or physical means after it has become part of the atmosphere complex.

The toxic level for many substances have been established by the American Conference of Governmental Industrial Hygienists[2] and serve as guide lines in submarine atmosphere control. However, the Maximum Allowable Concentration of a substance as established by the Industrial Hygienists is based on a continuous exposure of 8 hours a day and 40 hours a week and allows for normal body elimination and/or recovery during the remaining 16 hours in a day. Of necessity, we must consider the continuous 24 hour a day exposure in a closed cabin atmosphere to establish new Maximum Allowable Concentrations. These new Maximum Allowable Concentrations may very likely be lower than those established for industry.

A second consideration exists regarding the mixtures of toxic substances. The industrial standards are, in general, based on exposure to a single contaminant in an otherwise normal atmosphere. In a mixed contamination as is found in a closed cabin atmosphere, synergistic action between two or more contaminants may be an important factor and may require even further lowering of the Maximum Allowable Concentrations for certain substances.

Purpose

It was not the primary purpose of this study to verify the previously established concentrations of various submarine atmosphere contaminants nor to attempt to isolate any of the other substances believed or suspected to exist in a submarine's atmosphere. Furthermore no attempt was made to determine the Maximum Allowable Concentration for continuous 24 hour a day exposure for any single substance; but rather, the primary purpose of this study was to evaluate the total effect of this atmosphere complex on a number of physiological processes in man when he is subjected to this atmosphere complex for continuous prolonged periods of time during usual submarine operating conditions. It was the additional purpose of this study to elicit any immediate or subsequent physiological responses or deleterious effects which might arise from this chronic exposure.

Method

This study was performed on the crew of a nuclear powered submarine during a 72 day submerged cruise. Too accomplish the objectives of this study it was necessary to establish the prevailing atmosphere at frequent intervals as well as calculate the average atmospheric content for the entire period. It was also necessary to study the physiological status of the crew immediately prior to, during and shortly after completion of the trip.

The prevailing atmosphere was determined by making hourly measurements of the oxygen, carbon dioxide, carbon monoxide, Freon-12 and hydrogen concentration. Additional measurements were made every third to fifth day to detect and measure the amount of ammonia, benzene, chlorine, fluorine, hydrocarbons, mercury vapor, methyl alcohol and oxides of nitrogen that might be present.

The hourly oxygen readings were made with a paramagnetic analyzer. The carbon dioxide, carbon monoxide and Freon-12 levels were measured by infra-red analysis. The hydrogen determinations were made with a thermal conductivity meter. The tests for the presence of mercury vapor were performed with a portable mercury vapor tester. The remaining substances were detected by means of chemical indicators which change color in the presence of the specific substance being sought. The intensity of the color change is then compared to a color chart to determine the existing concentration of that substance.

To check the accuracy of the analyzing equipment, chemical determinations for oxygen, carbon dioxide and carbon monoxide were performed daily. As an additional precaution, a test was performed once a week (and whenever there was a disagreement between analyzer readings and chemical de-

terminations) using a sample of gas from a bottle of known mixed gases.

To determine whether or not the environment might also have some effect upon the physiological status of the crew, hourly measurements of the temperature, relative humidity and barometric pressure were included in this study. These measurements were also taken every hour using standard laboratory thermometers, humidigraphs and aneroid barometers. The accuracy of these instruments was verified by testing and calibrating them prior to and upon completion of the cruise.

The physiological status of the crew was determined by blood studies, exercise tolerance tests, metabolic measurements and evaluation of the general health before, during and immediately subsequent to the trip. The blood studies included hemoglobin and hematocrit determinations, and total white cell and differential counts. A baseline blood profile was established for each member of the crew by performing these blood tests on three consecutive days during the 30 day period immediately prior to the start of the the trip. The same blood determinations were then repeated at least twice during the latter part of the cruise and again within 48 hours after the completion of the trip.

An exercise tolerance test was devised consisting of rapid, alternating deep knee bends and push ups. The objective of this test was to compare the length of time required for the pulse rate and blood pressure to return to normal following exercise: (a) under normal atmospheric conditions, (b) while in a closed cabin atmosphere; and (c) subsequent to a prolonged exposure to a closed cabin atmosphere. To establish the normal recovery time the exercise was performed on three different occasions before the beginning of the trip. On each occasion the subject's pulse rate and blood pressure were recorded after he had been sitting quietly for at least five minutes. The prescribed exercise was then performed until moderate exertional dyspnea had developed. The subject was immediately seated again and the pulse rate and blood pressure determinations were repeated every 30 seconds until each had returned to normal. The same procedure was carried out at least once a week during the trip and on three consecutive days following the completion of the trip.

The metabolic determinations consisted of weight measurements, observations of dietary habits and calculation of the caloric requirements during the period of the test. The weight of each crew member was obtained on the first day of the cruise, at frequent irregular intervals during the cruise and on the day of arrival back to port.

Dietary habits were closely observed each day during the entire trip and the rate of consumption of each different article of food was recorded and compared with the consumption rate for the same food on nonnuclear submarines.

The caloric requirements of the crew were estimated by following the same technique used in a previous dietary study performed on a diesel submarine operation.[3] Utilizing the caloric values of foods after preparation as outlined in the Department of Agriculture Tables,[4] the total caloric content for all food stuffs loaded aboard the ship was obtained. Upon the completion of the trip all foodstuffs remaining were itemized and the caloric content was then subtracted from the total brought aboard. During the cruise all garbage was weighed after each meal before disposal and its caloric value was also subtracted from the total. The resultant number of calories was then divided by the number of men in the crew and the number of days at sea to obtain the average number of calories per man per day.

The general health status of the crew was determined by maintaining detailed records of the daily sick call. The incidence of disease and injury was then compared to the report on the health of submarine crews on war patrols during World War II which was compiled by Duff.[5]

Results

The results of the atmospheric measurements are contained in Table 1. The levels

TABLE 1

RESULTS OF ATMOSPHERIC MEASUREMENTS

Name I	Lowest Conc. II	Average Conc. III	Highest Conc. IV	Highest Normal Conc.[1] V	M.A.C.[4] VI
Ammonia	—	—	50 ppm	38 ppm	100 ppm
Benzene	—	—	< 15 ppm*	—	35 ppm
Carbon Dioxide	0.1%	1.04%	3.5%	1.1%	0.5%
Carbon Monoxide	5 ppm	44 ppm	74 ppm	38 ppm	100 ppm
Chlorine	—	—	0.1 ppm	1 ppm	1 ppm
Fluorine	—	—	< 1 ppm*	0.3 ppm	3 ppm
Freon-12	<1 ppm*	15 ppm	65 ppm	70 ppm	1000 ppm
Hydrocarbons	—	—	500 ppm	25 ppm	—
Hydrogen	0	1%	2.1%	1.75%	—
Mercury Vapor	—	—	< 0.1 g/L*	—	0.1 g/L
Methyl Alcohol	—	—	<150 ppm*	118 ppm	200 ppm
Nitrous Oxide	—	—	< 2.5 ppm*	27 ppm	—
Oxygen	138 mm Hg	150 mm Hg	162 mm Hg	158 mm Hg	—

* Lowest detectable level with the chemical test used.

determined by Piatt *et al.*[1] and the Maximum Allowable Concentrations (M.A.C.) for an industrial 8 hour day which have been established by the American Conference of Governmental Industrial Hygienists[2] are included in columns V and VI respectively for comparison.

The hourly measurement of the atmosphere revealed an overall average oxygen tension of 150 mm Hg (19.7%) with a range of 138 to 162 mm Hg (17.3%-21.2%). The carbon dioxide limits were found to be 0.1% and 3.5% with an average of 1.04%. The limits of the carbon monoxide content of the atmosphere extended from 5 to 74 parts per million (ppm) with an average of 44 ppm. The average concentration of Freon-12 was 15 ppm with a range of 1 to 65 ppm. The hydrogen level in the atmosphere varied from 0 to 2.3% with an average of less than 1%.

Benzene, fluorine, mercury vapor, methyl alcohol and oxides of nitrogen were either completely absent from the atmosphere or below the levels detectible by the chemical tests that were used. Ammonia was found in the atmosphere occasionally and reached a maximum of 50 ppm on several of these occasions. Chlorine was found on only one occasion and showed a concentration of 0.1 ppm. Aromatic hydrocarbons were found frequently in the atmosphere. The maximum level noted for the hydrocarbons was 500 ppm.

The results of the environmental study are shown in Table 2. The usual temperature range was from 68°F to 84°F with an average of 74°F. The relative humidity normally fluctuated between 62% and 84% with an average of 72%. The barometric pressure averaged 839 mm Hg (33 inches) with a range from 713 to 1013 mm Hg (28 to 40 inches).

On several occasions when the ventilation and air conditioning systems were shut down, the temperature and relative humidity exceeded these ranges. The longest occasion of this sort lasted for almost 36 hours and as a result the temperature in one of the ship's compartments slowly rose to 110°F while

TABLE 2

RESULTS OF ENVIRONMENTAL STUDY

Measurement	Average	Normal Range	Highest Level
Temperature	74°F	68°–84°F	110°F
Humidity	72%	62%–84%	92%
Pressure	839 mm Hg	713–1013	1013 mm Hg

TABLE 3

BASELINE BLOOD STUDY (102)

Name	Base Line		Follow Up	
	Average	Range	Average	Range
Hemoglobin	14.7	13–17	14.9	13.5–17 Gms%
Hematocrit	46.7	42–51	46.8	43–48%
W.B.C's.*	8800	5400–13,300	7900	5300–10,900
Neutrophils	5400	3500–6700	4750	3450–5400
Lymphocytes	2700	1850–4800	2400	1800–3900
Monocytes	500	150–900	400	150–700
Eosinophils	100	0–500	100	0–450
Basophils	50	0–150	25	0–100

* All totals on W.B.C.'s and Differentials are rounded off to the nearest 50.

the relative humidity climbed to 92%. With the exception of these rare incidents, the temperature and relative humidity remained within the comfort zone.

The baseline blood study was performed on 108 members of the crew. Six of the crew members did not have all three follow-up studies completed and were eliminated from the study. The results obtained from the remaining 102 crew members are recorded in Table 3. The average hemoglobin value was found to be 14.7 Gms% with a range from 13 to 17 Gms%. Individual variations on the three consecutive tests, were found to be 1 Gm. or less in all but two people. These two individuals showed variations of 2 and 2.5 Gms. respectively.

The average hematocrit for the group was 46.7% and ranged from 42% to 51%. Individual variations were from 0 to 5%. The white blood cell count showed an average of 8800 per cubic millimeter and extremes of 5400 to 13,300 for the entire group. Slightly more than one-fourth (28) of the group had a day to day difference of 2800 to 6400 in their consecutive counts. The remaining 74 crew members showed fluctuations of less than 2800 on their base line studies. The differential counts revealed the following levels: neutrophils, average 5400 per cubic millimeter, range 3500 to 6300; lymphocytes, average 2700, range 1850 to 4500; monocytes, average 500, range 150 to 700; eosinophils, average 100, range 0 to 500; and basophils, average 50, range 0 to 150.

The hemoglobin determinations, hematocrit levels, white blood cell counts and differential counts were repeated twice during the last two weeks of the cruise and during the first 48 hours after return to port. The data obtained from these three determinations were combined and treated in the same manner as the base line data. These results are included in Table 3 for comparison with the base line data.

On the follow up studies it was found that the average hemoglobin value had increased to 14.9 Gms% with a range of 13.5 to 17 Gms%. The hematocrit was essentially the same as before showing an average of 46.8% and a range of 43 to 48%. The average white blood cell count decreased slightly to an average of 7900 per cubic millimeter with a range of 5300 to 10,900. The differential counts were as follows: neutrophils, average 4750 per cubic millimeter, range 3450 to 5400; lymphocytes, average 2400, range 1800 to 3900; monocytes, average 400, range 150 to 700; eosinophils, average 100, range 0 to 450; and basophils, average less than 25 and a range of 0 to 100.

Twenty-seven crew members volunteered to perform the exercise tolerance tests. Utilizing the form of exercise previously described the participants were exercised on three separate occasions prior to the start of the trip, at least once per week during the trip and on three consecutive days after the completion of the trip.

Before the beginning of the cruise the

pulse rate recovery time for the group ranged from 1.5 to 7 minutes with an average of 4.2 minutes. The blood pressure returned to normal in an average of 3.3 minutes and varied from 1 to 4.5 minutes. Individual fluctuations were quite wide. Each participant demonstrated ranges of 1 to 3.5 minutes in his recovery rates on both the pulse and the blood pressure. As a result of these wide individual variations no significant change in recovery rates could be shown in the group during any phase of the study and no appreciable change in the group averages was seen.

On the first and last day of the trip all members of the crew were weighed. The average weight of the crew on departure was 165.8 lbs. with a minimum of 110 lbs. and a maximum of 219 lbs. Upon completion of the test period, the average weight was found to be 164.6 lbs. with a range from 117 to 201 lbs. Thirteen members of the crew had voluntarily placed themselves on weight reduction diets because of varying degrees of obesity. When these thirteen are eliminated from the results it was found that the average weight of the crew on completion of the trip had increased to 166.1 lbs.

The estimated caloric intake during the 72 day period was found to be 3125 Calories/man/day. On the previous study[5] using the same measuring technique, it was reported that the average crew member needed 3800 Calories/day.

No unusual dietary habits developed during this trip. The comparison of the inventory of provisions used on this trip was approximately the same as that noted on non-nuclear submarines during long patrols.

The sick call census revealed no appreciable difference in the incidence of upper respiratory infections when compared to Duff's[5] report on World War II submarine patrols. There was a slight decrease in the incidence of gastro-intestinal diseases and injuries, however.

Discussion

Regardless of the method of delivery it is necessary to supply approximately 1 cu. ft. of oxygen per man per hour at a partial pressure of 110 mm Hg or more. At the present time oxygen can be supplied from high pressure air banks, high pressure oxygen banks, oxygen generating chemicals or by the electrolysis of water. The advantages and disadvantages of these various sources of supply depend upon cost, ease of procurement, storage, hazards of handling, necessary power, etc. It is obvious, however, that the electrolysis of sea water is the only source not limited by storage problems.

On this particular cruise the oxygen was supplied from both high pressure air and high pressure oxygen banks. As the oxygen content of the ship's atmosphere was depleted, fresh air from the #1 air bank was added. After this air bank has been emptied, the stale air in the atmosphere was pumped back into the air bank using the ship's air compressors and the cycle was repeated using the 2nd, 3rd, and 4th air banks and so on until only one air bank remained. This last air bank was kept in reserve for emergency use. This gradual addition of air from the air banks and subsequent pump downs were the cause of the fluctuations in the atmospheric pressure.

When the air in all the air banks save one had been used in this manner, oxygen from the oxygen banks was added at the rate of one cubic foot per man per hour. There was sufficient air and oxygen to maintain the oxygen partial pressure between 138 and 162 mm Hg during the entire study.

The carbon dioxide level in the atmosphere was controlled by the carbon dioxide scrubbers. These scrubbers contain an amine solution which can absorb carbon dioxide at room temperatures. As the amine becomes saturated with carbon dioxide it is heated driving the carbon dioxide out of solution into a pump where it is flushed overboard with sea water. By this means the carbon dioxide content of the atmosphere was reduced to an average concentration of 1.04% for the entire seventy-two days.

Although the need for oxygen addition and carbon dioxide removal is obvious, the causes of the build up of the other atmos-

phere contaminants is much more subtle. Piatt *et al.*[1] and Ebersole[6] attributed the carbon monoxide build up primarily to cigarette smoking. Observations on this and similar ships have shown that the greatest build up of carbon monoxide occurs in the reactor compartment which is completely isolated from the ship's atmosphere and inaccessible to the crew. It has therefore been assumed that the main sources of carbon monoxide in the ship's atmosphere are the result of the oxidation of oils and lubricants especially on those machinery and steam engine components which are hot, and from the oxidation (aging) of paint especially that on the asbestos insulation on the steam pipes. From direct measurements made from these areas, high concentrations of carbon monoxide have been found. It has been concluded that the cigarette smoking is not the most important source of carbon monoxide production although it undoubtedly does contribute to some extent.

To reduce the amount of carbon monoxide being produced in a ship's atmosphere, widespread substitution of water-base paints and high boiling point lubricants has been effected wherever feasible. Although this greatly reduces the amount of carbon monoxide which is produced it is still necessary to control the carbon monoxide levels using carbon monoxide burners. These burners oxidize the carbon monoxide to carbon dioxide by means of heat in the presence of a catalyst. During normal operations the burners are able to maintain the carbon monoxide level below 45 ppm.

Normally the levels of the carbon monoxide and carbon dioxide were very stable at somewhat lower levels than the averages shown in Table 1. Also the oxygen concentration was somewhat higher. Occasional mechanical failures of either the burners or the scrubbers resulted in brief periods of higher concentration of carbon monoxide or carbon dioxide in the atmosphere. Also, periodic drills simulating submarine attacks were performed.

During these drills which lasted as long as four hours, it was necessary to shut off all noise producing machinery not actually involved in the propulsion of the ship. This included the air conditioning and ventilation system blowers, the refrigeration system compressors, the carbon monoxide burner and carbon dioxide scrubber blowers and the oxygen flow since pockets of high oxygen concentration could occur when the ventilation fans were shut off.

On one occasion, the mechanical failure of the blowers following a four hour drill period resulted in a 36 hour period during which the carbon monoxide and carbon dioxide continued to build up. After the repairs were made, it required an additional 8 hours before the levels for these two gases could be brought down to the established acceptable limits. As a result of these periodic drills and occasional mechanical failures, the over-all average of carbon monoxide and carbon dioxide were raised and that of oxygen lowered to the figures shown in Table 1.

Freon-12 is a refrigerant and is found in a submarine's atmosphere as the result of minute leaks in the refrigeration and ventilation systems. These leaks are so small that the freon-12 concentration remained well below the Maximum Allowable Concentration. However, freon is partially oxidized when it passes through the carbon monoxide burner forming traces of phosgene, hydrogen chloride, chlorine, hydrogen fluoride and fluorine. Since these substances have Maximum Allowable Concentrations well below that of freon, it is necessary to maintain the freon concentration below its acceptible concentration by eliminating all possible leaks. That successful control of freon leakage was maintained is indicated by the low levels of chlorine and fluorine which were found in the atmosphere.

Ammonia and the oxides of nitrogen are occasionally found in the atmosphere during improper operation or malfunction of the carbon dioxide scrubber. Overheating of the amine absorbent causes chemical break down of the amine to form ammonia and the various oxides of nitrogen. On several occasions during this cruise an ammonia odor was detected. On each of these occasions, ammonia

and oxides of nitrogen analyses were made. Oxides of nitrogen were never detected although ammonia was found in concentrations up to 50 ppm on these occasions.

In the past organic solvents have been used commonly for cleaning purposes. Submarine crews have been educated to the possible hazards of using these materials but an occasional check must be made to ascertain that one of these substances has not been used inadvertently. As a check against this oversight, the tests for methyl alcohol and benzene were performed. Neither of these substances were ever found during the entire cruise.

Hydrocarbons were commonly found in the atmosphere. They were especially prevalent during cooking especially during the frying of foods. The highest level noted was 500 ppm. The hydrocarbon concentration fell off rapidly after the cooking was completed and it is assumed that the hydrocarbons in the atmosphere were removed either by oxidation in the carbon monoxide burner or mechanically in the electro-static precipitator used to eliminate dust and smoke in the atmosphere.

Additionally, many or all of the other atmosphere contaminants listed by Piatt et al.[1] were undoubtedly present.

The temperature and relative humidity were also affected by the periodic drills but usually remained within the comfort zone even during drills. However, on the one occasion cited above, the temperature and humidity did increase gradually, continuing to rise beyond the comfort zone to reach the maximum levels recorded in Table 2.

With due regard for the prevailing atmosphere and environment, the comparison of the Blood studies performed before the cruise with those taken during and immediately following the cruise demonstrated no significant change in hemoglobin and hematocrit. A slight decrease in total white cell count with a corresponding decrease of neutrophils in the differential count was seen. Although the sampling was too small for statistical analysis there appeared to be less individual variation in the white blood cells during and following the trip than existed before the start of the trip.

The wide individual fluctuation in the white cell and differential counts noted on the base line studies was probably the result of attempting to establish the base line profile on those individuals at a time when they were coincidentally developing or recovering from a mild upper respiratory infection.

It has been noted by Duff[5] that the incidence of upper respiratory infections is markedly reduced during long submarine cruises and it has been postulated that this is the result of an increased resistance of the entire community to the limited variety of germs in the environment. This could account for the slight decrease in individual fluctuation in the white cell and differential counts found in the follow up studies. Similarly, the decrease in total number of basophils may represent a lack of allergenic stimuli in individuals with subclinical sensitivities. Further investigation is needed to refute or support this hypothesis, however.

Although physical stamina and endurance improved with the frequent repetitions of the exercises, no appreciable change in the recovery time for the pulse and blood pressure occurred before, during or subsequent to the prolonged exposure to this artificial atmosphere. This improved stamina and endurance is not unexpected in a group of individuals who normally lead rather sedentary lives. In this particular group, this improvement was enhanced by rather marked competitive spirit.

The decrease in caloric requirements which was found on this cruise when compared with the previous study[3] is attributable to the environment. The present study was performed during operations in temperate and subtropical waters whereas the previous study was performed on a submarine during a patrol in arctic waters.

The decreased incidence of Gastro-Intestinal disease and injuries is directly attributable to the improvement in submarine capabilities. Duff's report[5] was made on diesel submarines operating during World War II. World War II submarines operated more than half the time on the surface of the sea rather than under it. The present study was made on a nuclear submarine which remained

submerged during the entire period it was at sea and therefore was not affected by the wave motion on the surface of the water. As a result, motion sickness (and its Gastro-Intestinal complications) and injuries caused by the pitching and rolling of the ship were non-existent.

Conclusion

Seventy-two days continuous exposure to a controlled closed cabin atmosphere aboard an operating nuclear submarine resulted in no change in the general health status of the crew as measured by hemoglobin and hematocrit determinations, exercise tolerance tests, general appearance, vital signs, body weight and caloric requirements.

The decreased incidence in upper respiratory infections and concomitant changes in white blood cell and differential counts is the result of small community isolation rather than atmosphere control. The decrease in occurrence in Gastro-Intestinal disease and injuries is not attributable to the closed cabin atmosphere either, but results from the nuclear submarine's ability to remain submerged thus avoiding the rolling and pitching action caused by wave motion on the surface of the ocean.

It cannot be assumed that this or a similar artificially controlled closed cabin atmosphere is completely safe, however. It will be necessary to study further and in more detail the physiological, biochemical and metabolic processes of man over more prolonged periods of time while exposed to this type of atmosphere before we can be assured that the indefinite exposure to this atmosphere is not deleterious to him in his travels under the water or through space.

Summary

A comparison of the similarity of the closed cabin atmosphere control problem in a nuclear submarine and the future manned space ship are pointed out. The progress that has been made in submarine atmosphere analysis has been briefly reiterated and methods of control of toxic contaminants has been discussed. The need for the establishment of new Maximum Allowable Concentrations of toxic substances is also included.

This study was instigated to determine the overall effects of a complex atmosphere on specific physiological and metabolic processes rather than to evaluate the physiological response to specific contaminants in an otherwise normal atmosphere.

One hundred and eight healthy adult males between the ages of 17 and 37 years were exposed to an atmosphere with an average consistency of 19.7% oxygen, 1.04% carbon dioxide, 1% hydrogen, 44 ppm carbon monoxide, 15 ppm freon-12 and approximately 78% nitrogen continuously for 72 days. The atmosphere occasionally contained small amounts of ammonia, chlorine and aromatic hydrocarbons. Presumably other contaminants were also present in trace amounts.

The physiological and metabolic evaluations which were studied during the 72 day exposure consisted of the general health, vital signs, blood cell determinations, exercise tolerance, caloric requirements, and dietary habits. Using these criteria, no changes occurred which are attributable to exposure to the existing atmosphere and no harmful effects were elicited either during or shortly following the exposure.

References

[1] Piatt, V. R., Ramskill, E. A. and White, J. C.: Chemical Constituents of Submarine Atmosphere, N.R.L. Rpt. 5456, Jan. 20, 1960.

[2] Industrial Limit Values for 1959, AMA Archives of Industrial Health, 20:3, Sept. 1959.

[3] Schulte, J. H.: The Dietary Study of a Submarine Patrol in the Arctic, MRL. Rpt. 171, 10, 18-33, 1950.

[4] Tables of Food Composition, U.S. Dept. Agric. Bur. of Human Nutrition and Home Economics, Misc. Public. No. 572.

[5] Duff, I. F.: Medical Study of the Experiences of Submariners as Recorded in 1471 Submarine Patrol Reports in World War II, NavMed P1295, Apr. 1947.

[6] Ebersole, J. H.: Submarine Medicine on Nautilus and Seawolf, AMA Archives of Industrial Medicine, 18:200, Sept. 1958.

Memorable Events, Lives and Books
Calendar of Commemoration for 1961

By
CLAUDIUS F. MAYER, M.D.

"The Creator has given us souls
equal to all the World,
and yet satiable not even with a world."
(Sir Francis BACON: Novum organum, 1:129).

JUST 400 years ago a very exceptional man was born. Historians of science may set aside this new year of 1961 mainly for the celebration of the birth of this man, Francis BACON, who is generally credited with the introduction of the inductive method of thinking into science. He taught us how to collect single facts of experience and from experiments, and how to find from them the universal truth by research. Yet, knowing so much about the method of scientific progress, he himself never made any scientific discovery. Nevertheless, the Baconian spirit acted as a great stimulus upon other thinkers.

Bacon had an immense influence upon his age and upon decades and centuries after his death. This was evident all over the fields of science and everywhere in the lands of western culture. His optimism forecast an infinite future for human science and technology. He visioned that nothing is impossible for the fighting man, and no natural obstacles exist which human mind would not be able to triumphantly overcome, making us the ultimate rulers of the Universe.

The private history of individuals and the political history of countries and nations has thus a common element which is struggle and incessant fight to reach the final goal which is domination and mastery of the environment. Let us recall a few appropriate moments and memorable personalities from the past of mankind struggling towards a better future.

PART 1: MEMORABLE EVENTS

For this year's earliest commemorative date we may select 2111 B.C. when *Thebes,* the celebrated Egyptian city was founded according to the legend by Busiris, the fabulous king who used to kill all foreigners on the altars of his gods. *Thebes,* the "city with the hundred gates," is now in ruins, protected by the people of the small communities which arose on its site. We find another commemorative date from the Old Testament, the year 1161 B.C., when the Israelites were enslaved by the Philistines. In the same year, *Samson, the Hebrew Hercules,* was also born whose wonderful career and exploits are known to everyone either from the Bible or from "Samson and Delilah," the biblical opera accompanied by the delicious music of Saint-Saëns. Another biblical event is the destruction of the Israelitic army by pestilence (711 B.C.). In 561 B.C., *Nebuchadnezzar,* king of Babylon died. He made his country the "queen of the nations," captured and destroyed Jerusalem, and removed its people to Chaldea.

The year 161 B.C. brought the Jews and the Romans together in a treaty. It was arranged by Jehudah Makkabi ("the hammer"), commander of the Jewish underground insurrection against the contemporary Syrian domination. He died next year as one of the "nine worthies." In 111 B.C. the star of *MITHRIDATES* Eupator, or the Great Mithridates, began to rise. Still a young man, he conquered a number of countries around the Black Sea, and became king of Pontus. Later on, the Romans had much trouble with him in three successive wars. He was a well-educated man who imbibed Greek science, and had the mastery of 25 languages and dialects. In his headquarters he collected many art objects, pictures and statues. He also understood something about chemistry and poi-

sons, and his name came down through the centuries in connection with various arcana, antidotes and alchymistic secrets. In 11 B.C., Claudius Drusus, the stepson of Emperor Augustus, completed the *subjugation of the Germans.* With the canal which his legions dug out to connect the Rhine with the Yssel ("fossa Drusiana") for the Roman galleys to assure supply for his troops, he left us an ancient example of how military leaders of the Antiquity appreciated the importance of logistics in military operations. From the very end of the period of classical Antiquity we select the year 361 A.D. when Julianus, nicknamed the Apostate, ascended the throne of the eastern Roman Empire. When he was a little boy, the political rivals of his father exterminated the whole family of Julianus. The memory of this embittered him, and stripped him of all belief in Christianity. No wonder that he tried everything to restore paganism in his empire.

A very important date is 711 A.D. On 19 July of this year, Tariq, at the head of 12,000 Saracens, was met by the armies of King Roderick at the mouth of a small river. The king's army was utterly routed, due to the treachery of the king's political enemies. Thereafter, the Moslems had an easy promenade through Spain. Cordova fell, again due to the treachery of a shepherd who pointed out a breach in the wall. Toledo fell since it was betrayed by certain Jewish residents. Thus, by the end of the summer of 711 A.D., the Moslem Tariq was the master of half of Spain.

This year, Sweden will remember her glorious days under *Gustavus Adolphus,* the Great, who ascended the throne of Swedish rulers in 1611 A.D. In the same year, in the New World the Spaniards massacred the Talamanca Indians of Central America. In Virginia, the new settlers established the first Presbyterian Church. A hundred years later (1711), Peter the Great, after having Alexieva Catherine as his mistress, married her privately, and soon announced her as the Empress of Russia. That year one of the usual periodic *Turkish-Russian wars* ended with a peace treaty in which Peter had to give up the Azov, and all possessions on the Black Sea to the Turks. Over here, the French expeditions continued in Canada, and Quebec was besieged by the English.

In 1811 the *Mamelukes* came to the end of their power in Egypt. Mohammed Ali treacherously inveigled and destroyed 470 of their chief leaders in Cairo. In the New World, *Paraguay and Venezuela* proclaimed their independence from Spain. This was followed by a war of several years' duration. In the U.S., the exports exceeded the imports for the first time by some 8 million dollars. Some progress was made in establishing *trading posts* among the Indians. In Oregon, at the mouth of the Columbia River, a trading post was also erected by the Pacific Fur Company under the Astor regime. On the other hand, the fight with the Indians also continued, and 1811 witnessed the famous *Battle of Tippecanoe.*

The year 1861 was very important in the political history of the whole world. In the Far East, a part of the allied troops settled in Tien-tsin, and established a consulate. English and French embassies opened in Peking, and Admiral Hope made a reconnaissance of the Yang Tse Kiang. *In Russia, Alexander II abolished serfdom.* In Italy, Vittorio Emmanuele II became king of Italy; with his minister, Cavour, he was the real creator of Italian unity. In Austria, the people received a new constitution which guaranteed religious freedom and political rights for the protestants. In the New World, Spain annexed San Domingo, while the troubles in Mexico under dictator Juárez required an intervention of several European states. In Ecuador, a new dictator arose also who began to persecute the Catholics.

In the United States, 1861 was the *first year of the Civil War.* In that year, Colorado, Dakota and Nevada were organized as territories. During the year, a total of 142,877 immigrants arrived. President Lincoln inaugurated the *Army Secret Service Bureau,* and appointed Allan Pinkerton as its chief. In New York, a certain Nathaniel

Gordon, master of a vessel called "Erie" was convicted and hanged for slave trade. On December 30, 1861, all banks of New York suspended cash payments, certainly as a result of the Civil War.

The political maneuvers of the secession of the states went hand in hand with the progress of hostilities. The Secession Convention at Montgomery, Ala., inaugurated Jefferson Davis as president of the Confederacy on 18 February, 1861; then, the seat of the confederate government was moved to Richmond, Va., in July. The Civil War itself was inaugurated by the firing upon the "Star of the West," a merchant vessel carrying government supplies and men to Sumter, S.C. on 5 January 1861. There were no casualties. Until April 1861, there was no direct fire upon any fort, and no bloodshed. The first bloodshed happened at Baltimore when an irate mob of citizens killed 4 union soldiers and injured 20 others. Fort Sumter surrendered in April, and Lincoln had to call for volunteers for the first time. He also ordered the blockade of all ports of the southern states. The first engagement took place on 1 June at the Fairfax Court House in Virginia, and the first serious engagement was the battle at Bull Run, a Virginia creek, on 21 July. In September the first naval engagement took place at Pensacola, Fla., and in October "Ball's Bluff" happened at Leesburg when the northern army lost over a thousand men in a mere reconnaissance mission. This misfortune cast a suspicion of treason upon General Stone, commanding officer, who was arrested the next year.

Arts and Sciences

The new year stirs up many interesting dates and events in the history of science and culture. We have heard of the magnificent *baths of Caracalla,* of the Roman emperor who in the year 211 A.D., when he succeeded his emperor father, ordered the erection of these sumptuous buildings. The baths contained many statues and pictures, including the so-called Farnese Hercules. There were marble accommodations for 1,600 persons. The water came from the great aqueducts. Rooms were available for cold bathing ("frigidaria"), warm bathing ("tepidaria"), and swimming ("piscina"). Even in its present-day ruins, near the the Porta Copena, the bathing establishment of Caracalla still remains magnificent.

For the Moslems, 611 A.D., is a sacred year. Mohammed was just 41 years old, and he announced himself as the *Prophet of Allah.* He said then that one year before, at Mount Hira near Mecca, archangel Gabriel had appeared to him, and in the name of God had commanded him to preach the true religion. In 611 A.D., Mohammed communicated this first revelation to his wife, daughters, stepson and one friend, Abu Bekr. It took him 3 years to make 40 followers, chiefly slaves and very humble people. Yet, a hundred years later (711) his believers flooded all over the ancient Latin and Greek world, and they were banging on the doors of western Christianity.

The year 861 A.D. is set aside as the date when the Norseman Nadodd discovered *Iceland;* soon afterward the remote island was settled with emigrants from Norway. In 1161 a stone castle was built in Ireland by the King of Connaught which was so new and uncommon in style that the people called it the *"Wonderful Castle."* The same year's history brings up such events as the burning of Jewish physicians at Praha on the charge of "poisoning the wells," the will of a bishop who left his medical books to the cathedral library of Hildesheim, or the regulation of the public "stews" (:brothels) by Henry II. In 1211 the University of Paris was recognized by the Pope; such a recognition was essential for the operation of a medieval university. In 1361 the Pavia University was chartered by Charles IV as a studium generale. In the same year, one of the rather frequent medieval plague epidemics (black death) visited England. Elsewhere in Europe, people died from *violent earthquakes.* Thus, the southern Adriatic coast of Italy was vehemently shaken, and at Ascoli 4,000 persons died, while in Siena the 4-day long quakes destroyed many buildings. We read about a cer-

tain *Guillaume de Lafont*, a master of medicine, who was very wealthy and lived in great style. He had several valuable books which in his will, dated Avignon 1361, he willed in various ways. His medical books were to go to the Montpellier medical school. Two books of Avicenna and one of Galen were to be sold, and the proceeds given to the Montpellier hospitals. The manuscript books in those days represented a fortune.

In 1411 A.D. the *University of St. Andrews* was founded by a bishop in East Scotland. The annals of this year report about the mass conversions of the Jews by Saint *Vincent Ferrier*, Dominican preacher. How many of these conversions were due to the fear of the inquisition is not mentioned. A collection of recipes relative to painting and other crafts was completed this year by *John Alcherius* in Paris. It was a wonderful collection which told the reader how to make ink in the Italian way; how to gild as the Flemish painters were doing; how to harden iron, or to prepare ultramarine, and so on.

In 1511 A.D. *Cuba was conquered* by Diego Velázquez, and first settled by the Spaniards at Baracoa. The Portuguese also made expansion of their overseas empire. Siam was rediscovered by them this year, they settled at Malacca and reached Java. The intercontinental commerce gradually developed; for instance, coffee came to Constantinople from Egypt and from Syria. This was the year when *Martin Luther*, still a Catholic monk, visited Rome on official business. He was not much impressed by Pope Julius II who spent most of his time in fighting and building, and not in spiritual matters. The invention of the *air-bed* dates back to this early renaissance year; it was supposedly suggested by a German publication.

In 1561 the University of Douai was founded, and in London the *St. Thomas Hospital* was created. At Cassel, they built an observatory. At Sandwich, in Kent, Queen Elizabeth settled some Flemish silk and woolen factories. This is the year when *ergot* was introduced into therapy by Adam Lonitzer, and when Ambroise Paré, French military surgeon, laid the foundation of orthopedic surgery. In a work published in Basel, the term *"Pharmacopoeia"* was first used. Pierre Franco revealed his secrets of hernia surgery, and the Italian Fallopio published some important anatomical observations, describing several human structures which still carry his name (*Fallopian tube* or oviduct, the ductus arteriosus, the facial canal, the oval and the round windows of internal ear, the chorda tympani, etc.).

In 1611, more than 200,000 died from the plague in Constantinople. In Manila, the University of St. Thomas was founded. About the same time, Villa Real described an epidemic of diphtheria (garrotillo) in Spain. In Italy, the study of Roman antiquities continued, and Pope Paul V restored the aqueduct of Emperor Trajan. In London, Charter-House ("Chartreuse"), a former Carthausian monastery (built in 1371) was sold by the Earl of Suffolk to Thomas Sutton who made it the *"hospital of King James."* That year, James I instituted the *baronet rank* as a result of a rebellion at Ulster. At his creation the baronet was supposed to pay into the treasury as much as would maintain 30 soldiers 3 years at 8 pence a day in the province of Ulster in Ireland. It was specified that a baronet should be a born gentleman, and should have a clear estate of 1,000 £-per annum. The first baronet was Nicholas Bacon.

The *University of Lemberg* was founded in 1661. In Rome the *Alessandrina Library* was established, and in England Charles II chartered the *Royal Society*. Edinburgh's first newspaper, the *Mercurius Caledonius* was launched. In Versailles, Louis XIV began to enlarge the existing buildings into a magnificent palace, making it the permanent residence of the kings of France. In England *Richard Wiseman* was appointed surgeon to Charles II with an income of $4,000 a year. This is also the year when the British Army arose mainly in consequence of the extinction of feudal tenures. The new army was plagued

by the current epidemics of the year, typhoid and scarlet fever. The advancement of science and medicine is shown by such as the discovery of the duct of the parotid gland (Stensen), of the pulmonary capillaries (Malpighi), of the renal ducts (Lorenzo Bellini), of the meibomian glands in the eyelids. De Graef found that the ova arise in the ovary. John Graunt's studies became the foundation of demography and medical statistics. (By the way! In his estimate the population of London was 460,000 in 1661.) Hook started to study the principle of the telephone, and Robert Boyle isolated acetone and obtained methyl alcohol (wood alcohol) by the distillation of wood.

Herculanum, ancient city of Capua, was covered with the lava of Vesuvius when the volcano erupted in the first century of the Christian Era. In 1711 the first excavations started and have continued since. The Berlin citizens erected an observatory under the direction of Leibniz, while in Rome the *Biblioteca Lancisiana* was established. At Oxford, the building of the *Clarendon Press* was erected, and the expenses were defrayed out of the profits of Lord Clarendon's History of the Rebellion. On 1 March 1711, the first issue of the *"Spectator"* appeared on the London streets. It was issued every week-day morning in the shape of a single leaf as a successor of the "Tatler." Among its contributors were Addison, Sir Richard Steele, Hughes, and others. That year Handel's opera, the *Rinaldo,* was staged on the Haymarket. It is a strange fact that in that year a duty was put upon soap in England (and soap remained taxable for more than a hundred years). Among the year's inventions we find the advertisement of an *early taxicab* in the London Daily Courant where it was announced that at the sign of Seven Stars under the Piazza of Covent Garden, a chariot was in view that would travel without horses and "measure the miles as it goes." It was capable of reversing and turning, and it "could go uphill as easily as on ground." A pamphlet of that year fully described Cristofori's new invention, the *pianoforte,* in which a row of hammers controlled by keys struck the strings from below (see also 1959 Calendar). Another musical investion was the *tuning fork* which John Shore, the trumpeter of George I, introduced for the first time.

Physicians of 1711 started to become conscious of hysteria and hypochondriasis which in the contemporary literature were described as "vapors" and "spleen." Heister performed the first autopsy on a fatal case of the disease which now we call appendicitis. In the North American mainland, under the name of *"Tuscora Rice"* the first American patent medicine was introduced; it was recommended against tuberculosis. A Nantucket *whaler* captured a sperm whale. This started an industry which gradually grew, until about 150 years later there were over 700 whaling vessels.

Two hundred years ago the English king purchased *Buckingham Palace* to make it later the residence of the English sovereigns. In France, a national school for veterinarians was founded at Lyon. It was in 1761 when Massachusetts outfitted an expedition in which *John Winthrop,* physicist, went to New Foundland to observe the transit of Venus. In Philadelphia, the directors of an insurance company decided to apply their fines (on account of non-attendance) for purchasing *milestones for the Trenton-Philadelphia road* (they did the actual purchasing only three years later).

The year 1811 was characterized by various disasters and natural catastrophes all over the world. For instance, there were great floods in the Danubian valley; whole villages together with the inhabitants were washed away in Hungary. In Madras, the hurricanes were troublesome. In the Azores a volcano appeared in the sea where the water was 80 fathoms deep; an island was formed which later gradually disappeared. Even in the *Mississippi Valley, many earthquakes* occurred and great chasms opened in the earth. Among the remarkable separate individual events, there was the achievement of the 60-year old *Thomas Standen,* of Salehurst, who walked 1,100 miles in 1,100 hours (one mile per hour)

and finished his walk in July. In the same year an Englishman committed suicide by *jumping into the furnace* of a forge. The first and the most *famous Siamese twins* were also born that year; they were united by cartilage at the pit of their stomach. Chang and Eng were discovered on the banks of the Siam river by an American (Robert Hunter) who took them to New York where they were exhibited. Ultimately, they settled in the U.S., had a farm, married two sisters, and within hours of each other they died at the age of 63.

During 1811 the *Christiania (Oslo) University* was founded, and the Stockholm Medico-Chirurgical Institute was established for the instruction of Army and Navy surgeons. The *Dublin Institute* has the same birth year. The University of Salerno was abolished by Napoleon. In the U. S., the *Massachusetts General Hospital* was established, and an unsuccessful attempt was made to establish a school for the deaf and dumb in New York and in Virginia. In 1811 the magic lantern was first used for special scenic effects in the production of the "Flying Dutchman" at the Adelphi Theater. This year, Sir William *Herschel* put forward his nebular hypothesis according to which the Universe was formed out of shapeless masses of nebulae or clusters of small stars. *Chevreul*, father of the fatty acids, started his research on oils and fats which ultimately resulted in a great improvement in the manufacture of candles. In the same year, Courtois discovered *iodine* in the ashes of a seaweed; Berzelius described the weight proportions in the chemical processes. Thomas *Young* started his experiments with light, and developed his wave theory. *Cuvier* established his theory of catastrophes in the development of Nature. In 1811, the function of the spinal nerve-roots was discovered (Bell), chloroma was described as a pathological unit (Burns). Heine introduced a series of new therapeutic apparatuses, and Jahn popularized gymnastics in Germany.

In the United States the Ohio River carried the first steamboat in 1811. The *first ferryboat* in the world propelled by steam was operated on 11 October by John Stevens between Hoboken, N.J., and New York City. In Boston, the *first news agency* was established. It was the "Gilbert's Coffee House and Marine Diary" where news was discussed at coffee hours. The *first wedding in the White House* occurred on 11 March when the widow of a nephew of George Washington, at the same time a sister of President Madison's wife, was married to a Justice of the U.S. Supreme Court. In 1811, a French immigrant, Stephen Girard, a resident of Philadelphia, purchased himself the banking honor and the stocks of the old bank of the United States, and commenced a successful banking career. It made him the *richest American of his time*. From his tremendous wealth he founded many humane institutions; among them was a college for "poor white children," with certain restrictions.

One hundred years ago a terrible earthquake in March had almost destroyed Mendoza in Argentina. Railroad accidents began to climb; two trains collided in the Clayton Tunnel, and many were killed. In England the supply of cotton from North America was greatly reduced during the Civil War; this caused a *"cotton famine"* and much unemployment and poverty. It was in November the first time when petroleum was exported from America to Europe, to London, and the crew of the ship had to be "shanghaied" because no one wanted to work on an oil cargo. Previously, a big fire broke out in a London wharf from combustibles, and it continued to burn for a month. This year, Malta and Alexandria were connected with a telegraph. A German invented an instrument which he called a telephone; it telegraphed musical sounds by means of electric current passing through a coil of wire with a soft-iron core. Siemens invented furnaces in which gases were used in glass works. Lenoir manufactured and patented a *gas engine* in which the motive power was obtained by ignition of combined gases by electricity. Among the chemists, Crookes discovered

thallium (atomic weight: 204). Graham, who was master of the mint, introduced dialysis for the *separation of colloids* from crystalloids. Indeed, the International Exhibition of 1861 at London had many evidences of progress to show.

The world of medicine and biology of 1861 produced the first Congress of Anthropologists. Broca described the *speech center,* and the various forms of aphasia. Pettenkofer and Voit founded the study of basal metabolism and calorimetry. Kölliker's histological and embryological observations were published. The contemporary physicians read about neural endings in the muscles, labyrinthine hemorrhage (Méniere) as a cause of vertigo, arthritis deformans (Virchow), alkaptone found in the urine (Bödeker). Thure Brandt introduced his much criticized *bimanual massage* in gynecological diseases, and Ernst Brand attempted the treatment of typhoid fever by hydrotherapy.

In the United States, in spite of the Civil War, various institutions of learning and charity opened in 1861, as the New York Samaritan Hospital, the Massachusetts Institute of Technology, Vassar College, etc. The "doctor of philosophy" degree was awarded the first time in the U.S. at Yale University. On 4 March, the already established Government Printing Office began to function. An orthopedic chair was established by the Bellevue Hospital Medical College. The *first military hospital* to be built on the pavilion plan was at Poolesville, Md. In the Woman's Hospital of Philadelphia the *first school for nurses* was chartered. The laryngology instruction was offered regularly for the first time at the New York City University Medical Department. In Milwaukee a renal tumor was first excised (Wollcott). Oliver Wendell Holmes, the physician poet, invented a stereoscope. In New York City, Faber started to *manufacture a pencil* with a rubber tip attachment. Among other noteworthy inventions or novelties of 1861 were the shoe-sewing machine, the driven well, the Otis passenger elevator, and *barbed wire* which was introduced that year into the United States.

Part 2: Memorable Lives

Among the memorable personalities of Antiquity we find *Protagoras* (d.411 B.C.), one of the earliest Greek sophists. He was contemporary to Socrates, and his name also occurs in the Dialogues of Plato. He taught in Athens, in Sicily and elsewhere. His practical principle was that "man is the measure of all things." In his opinion, truth is only relative, even for the same person but at different times; everything is relative, and everything is in a transition to become something else. Consequently, everybody would be right from his own point of view, and everything would depend upon one's own capacity of self-assertion. These are dangerous ideas. No wonder that Protagoras was persecuted by the Athenian authorities; his writings were burnt at the market of the city, and he had to escape for his life; while doing so, he died at sea. In the 19th century he was considered the true founder of positivism. In the year when the sophist died, *Timoleon* was born. He became one of the dreadful enemies of the Sicilian tyrants, and one of those figures of classical Antiquity whom Plutarch held worthy to describe in his "Lives." Another well-known ancient classical figure was *Pliny, the Younger* (b.61 A.D.), one of the most accomplished men of his time, who ascended on the Roman ladder of offices up to the rank of consul. He was a friend of Emperor Trajan, with whom he kept on a correspondence in Cicero's masterful style. His "Epistles" have been recopied and reprinted throughout the centuries many times. Still a product of Antiquity is *Ulfilas* (311 A.D.), Arian missionary bishop among the Wisigoths, whose translation of the Gospel into the Gothic language is still extant in fragments. This is the oldest literary relic of barbarism, and a monument of an extinct people and of an extinct language.

The advancing Islam produced a number of noteworthy personalities not only in pol-

itics but also in the field of administration, religion, and science. There was, for instance, *Ali* (d.661 A.D.), the fourth Caliph, husband of Fatima, the daughter of Mohammed. He was the first convert to Mohammedanism, and was the bravest follower of the Prophet. He was called "the lion of God, always victorious." The present-day Persians follow the interpretation of the Quran according to Ali (sect of Shiites or Fatimites). In the year of his death, Ali was on his way to the mosque at Kufa, when he was struck on the forehead with a poisoned sabre. The weapon penetrated the brain. The assassin wished to avenge certain relatives of a lady friend of his who had been slaughtered. The dying Ali ordered that his corpse be put on a loose camel, and buried wherever the camel was to kneel down. This place was kept secret for many years until one and a half centuries later Harun-ar-Rashid, the fabulous kalif of Baghdad, fell upon it by chance. Ali dead proved to be more effective than Ali alive. He became a canonized martyr, and the paragon of Moslem nobility and chivalry, and the Solomon of the Arabic tradition. Among the Moorish rulers, *Abd-ar-Rahman* (d.961 A.D.) was the greatest of a long line of emirs. His period marks the zenith of Arab epoch in the Spanish Peninsula. We mention him particularly since he was the founder of the School of Medicine at Cordova. Three other famous Moslems adorn our gallery of eminent figures this year: *Ghazali* (d.1111 A.D.), the greatest Moslem theologian and mystic philosopher who came nearest among the Mohammedans to subscribe to Christian ideology; *Abdollatif* (b.1161 A.D.), who is known as a famous traveler, but he also was a teacher of medicine and philosophy at Cairo and Damascus, and in his studies of osteology he found that Galen was mistaken in many respects; *Shams-ad-Din* (b.1211), whose "Obituaries of Eminent Men" is an accurate and elegant collection of 865 biographies of the most distinguished Moslems. This is the first dictionary of national biography in Arabic.

Among the western scientists of the Middle Ages the figure of *Arnold of Villanova* (1235-1311) is outstanding. He was from Spain but he studied at the medical school of the Montpellier University. He developed into a peculiar type of medieval research man who was interested in all mystic powers of Nature. He tried his hand at making tinctures, alcohol. Indeed, some say that Arnold was the first who manufactured a good brandy. The difficulty in reading his many Latin works (he was a prolific writer) is evident from the fact that in the style of the medieval alchymists he camouflaged the correct name of everything behind a flowery label; thus, "potable gold" was actually the alcohol that he produced. He also experimented with artificial impregnation, and thought that with the aid of his available alchymistic forces he could manufacture a miniature man, a homunculus. For such experiments he got into trouble with the ecclesiastical authorities, who considered him a heretic, and put him in jail. Only his influential royal friends could save him.

At the start of the renaissance period Ambrogio *Calepino* (d.1511), Augustinian monk died. His name became identified in the scholastic circles with Latin dictionaries, one of which he compiled and published (1502). Even in the modern French language, his name is synonymous with "notebook." Some way to remain immortal! His contemporary was *Giorgione* (d.1511), painter, musician, and a pupil of Bellini, together with Titian whose friend and rival he became. He tried to imitate the works of da Vinci, and his "Enthroned Madonna" and frescoes in Venice show great beauty, richness of coloring, which make him one of the greatest of the Venetian painters. He died of the plague. In the same year (1511) *Georgio Vasari* was born. He was a painter, a student under Michelangelo, and a great architect, who became famous because he was the Plutarch for his contemporary artists. His biographies are mere anecdotes, almost novels, but they still serve as one of the basic reference tools for the students of the renaissance

history. His contemporary was *Michael Servet* (1511-1553) whose name is associated with the history of medicine because in one of his theological writings he used an allegory which reveals his correct knowledge of the pulmonary circulation (see also 1953 Calendar). Since this happened before Harvey's description of the blood circulation, he has been considered by many as the discoverer of the lesser circulation. Servet was also a physician.

Pierre Franco (d.1561) was the most famous and the busiest itinerant surgeon of the renaissance period. He excelled in the operations of hernias and stones of the urinary bladder. He devised his own instruments and his own methods some of which have been used for centuries after his death. The opening of the bladder above the pubic bone was one of his daring surgical interventions; this, and the surgery for strangulated hernia he described in several works. In the year of Franco's death there was born *John Harington* (b.1561) whose godmother became Queen Elizabeth. She liked him for his wits, and he received many favors. He performed some literary work by translating Ariosto's Orlando Furioso into English. But his fame comes from the fact that he invented the water-closet, the first description (in 1596) he entitled "The Metamorphosis of Ajax," a truly Elizabethan piece of art.

The same year brought *Santorio Santoro* (1561-1636), physician of Padua and one of the early physiologists. He was a good friend of Galilei, from their student years at the Padua University where Santoro graduated in 1582 as M.D. Under the influence of his physicist friend, he wished to introduce the quantitative measuring method into all phases of medicine, and thereby he became the founder of the so-called iatro-mathematical medical school. He invented many instruments, a clinical thermometer, a trocar, a cannula for tracheotomy, a pulse counter, a balance for measuring the perspiration that cannot be perceived, a couch which enabled the sick to take a bath without exertion. He did not care about drugs; indeed, he thought that the poor people who cannot afford the drugs will recover easier than the wealthy whose night-stand is full of medicine bottles. Of course, his instruments were still very primitive. Thus, his thermometer was a curious graduated tube of glass in a serpentine shape and of some length. The upper globular end the patient was supposed to take into his mouth, while the lower end of the tube was put in a vessel of water. His pulsimeter or "pulsilogium" was something like a modern metronome which had to be adjusted until its oscillation became coincident with the pulse beat. Santoro's basic publication was the "Art of static medicine" (Lpz., 1614) by which he became the founder of metabolic physiology.

The greatest personality of the new year is *Sir Francis Bacon* (22 Jan. 1561—6 Apr. 1626), Lord of Verulam, Chancellor of England under James I, and philosopher. He was born in London, studied at the Trinity College of Cambridge, and already in his early years he began to dissent from the Aristotelian philosophy which is built upon the scholastic method of deduction and authority. Already in his youth he was a counsellor to the Queen, and he quickly advanced in ranks and honors. In his "Novum Organum" (1620) he expounded the inductive method. In his "New Atlantis" he gave a utopistic picture of an institution of organized scientific research, the "house of Solomon," which helped in forwarding the Royal Society of London. His contribution was no individual scientific discovery, but the methodology of science itself. He became lord high chancellor in 1619, but in 1621 he was accused of bribery and corruption; he pleaded guilty and was fined 40,000 pounds, and was declared incapable of holding any other office. Yet, ultimately, he was granted a pension and was permitted to retire. What a cruel fate for such an ambitious man!

Henry Hudson, navigator, and discoverer of the bay and of the river named after him, made several efforts in the spring of 1611 to complete his discoveries, but in

June, together with his son and with seven sick men, he was set adrift by his mutinous crew in a shallop, and he was never heard of again. His main ship arrived at Plymouth in September 1611. The same year gave birth to *Johannes Gronovius*, one of the numerous scholarly products of this well-known German family which settled in Holland. This man was a classical scholar, edited a number of Latin authors, and had a great reputation as a numismatist. Another medical man with Dutch relations was Le Pois or *Piso* (b.1611) whose name is preserved for his travels in India (the East Indies) and in America (West Indies). He described the natural history and the medical matters of the two Indies (Amsterd., Elzevir, 1648) in a beautifully illustrated volume. He introduced ipecac into Europe, and was able to distinguish the manifestations of syphilis from the tropical treponematosis called the yaws. Modern readers may find among his observations the first description of several unusual diseases, including that which the modern dermatological nomenclature calls mycosis fungoides.

Around the middle of the 17th century *Jules Mazarin* (1602-1661) died. He was a powerful minister of France, who, though he was not an ordained priest obtained the cardinal's hat under the influence of his great patron, Cardinal Richelieu. He was of Italian extraction, a naturalized Frenchman. As a successor of his patron he had supreme power in France, which made him the object of general hatred and of the sarcastic "mazarinades" published about his life. He was a good uncle, and imported all seven of his nieces from Italy and married them off to French nobility. He left an immense fortune, and a magnificent library which was amalgamated to the Bibliothèque Nationale.

A famous military surgeon was in his time *Matthaeus Gottfried Purmann* (d. 1711) who joined the Brandenburg army and excelled by his courage and great skill. Though he considered that the true basis of surgery is the anatomical knowledge of the operator, he still believed in the therapeutic effect of the weapon salves, as he described them in his published work on military surgery. The year 1711 was the birth year of *David Hume* (d.1776), Scotch sceptic philosopher and historian, of *Mikhail Lomonosov* (d.1765), scientist and father of the Russian literature, of *Franz Baron von Trenck*, Austrian adventurer, and of *Johann Lieberkühn*, German anatomist. David Hume, at the age of 26, shocked all Christendom with his highly theoretical "Treatise on Human Nature," which is considered one of the classics and marvels of modern philosophy. He declared that there is no soul; that the laws have no necessity, and only the mathematical formulae have a necessity. Lomonosov was the son of a fisherman, but he received a good education, and became professor of chemistry in the Petersburg Academy of Sciences. He was interested in the Russian language, and compiled the first Russian grammar (1755), wrote a history of Russia, and produced epical poems and dramas. In addition, he was engaged in research in natural history, physical chemistry, electricity, geology and metallurgy. Indeed, he was an universal genius. The adventures of Franz Trenck and of his cousin make interesting reading in their autobiographies, and they served as a basis for several romantic novels (e.g., Jókai: The Two Trencks). Lieberkühn was interested in microscopic technic, which he improved so much that he was able to discover the numerous small glands, later named after him, in the wall of the small intestines (in 1745).

Two hundred years ago, John Dollond, the inventor of the achromatic telescope died. He was originally a silk weaver, and only after 46 years of age, when his son opened an optical shop did Dollond become an optician. For his invention he was awarded the Copley medal, and was also elected a fellow of the Royal Society. Among the 1761 deaths we mention *Pierre Fauchard* (b.1678), the father of modern dentistry, and *Stephen Hales* (b.1677), English clergyman and scientist. Fauchard

started to cement the teeth and to fill the cavities with lead. He used to make prosthesis from bones of elephant, hippopotamus and of the common ox. A full lower denture he would attach by steel springs to the back of the mouth. For brushing the teeth, he recommended a small, fine sponge. He was also the describer of the condition known as pyorrhea alveolaris (1744). Hales was a good friend of the Prince of Wales. In his student years he used to travel much, studying the plants and the animals. In 1710 he became the curate of Teddington which he remained until his death. For his botanical research he was elected a member of the Royal Society. He observed the circulation of the sap in the plants, and this led him to experiments with the circulation of blood, and to the study of hemodynamics. In one of his publications on "haemastaticks" he described a manometer with which he first measured the blood pressure (1733). He also invented artificial ventilation and devised an apparatus for the renewal of the air in jails, hospitals, mines.

Among the bicentennial birthday celebrants we find *Patrick Cotter,* the Irish giant, and *Emma Hamilton,* Nelson's sweetheart. The Irish giant was born at Kinsale, of poor parents of ordinary stature. He was brought up as a bricklayer but at 18 years of age he was hired as a showman for a miserable fee. His height is given differently between 7′10″ and 8′7″. His hand, a plaster cast of which is preserved at the Royal College of Surgeons, from the palm to the extremity of the middle finger was 12″, and his shoe measured 17″. Emma Hamilton embodied the type of English female beauty. She was mistress of a number of outstanding men, and played a great role in English society. She was originally detected by Dr. Graham, the quack who engaged her for his Temple of Health. Later, she was the model of contemporary artists, and ultimately she became Lady Hamilton. She died in poverty in Calais.

August von Kotzebue (b.1761) was a German writer and actor, who devoted himself to the theater even when he was supposed to study the law. He wrote many dramas. Once, he was sent to Siberia. In spite of his liberal ideas, he was assassinated by a student in Jena.

Also in 1761 was born *Karl Tauchnitz* (d.1836) who first set up a small printing shop in Leipzig to which he soon added publishing. In 1809 he started his edition of classics which were praised for their elegance and economy. A few years later he introduced stereotyping in Germany. *Jean Louis Pons* (b.1761), French astronomer, has been called the "comets' hunter" because from 1801 to 1827 he had discovered 27 new comets. Among the contemporary physicians in Europe, *Matthew Baillie* (1761-1823), the nephew of Hunter, merits special mention. He was a practitioner in London, and physician to King George III. As a leader in medical practice he became the owner of the famous "Gold-headed Cane." He wrote an English book on pathology, and his is the first record of the heart on the right side (1788).

In the U.S., bicentennial birthday celebrations are due to *Mason Fitch Cogswell* (1761-1830), of Boston, who was the first to ligate the common carotid artery in 1803; to *Jedidiah Morse* (1761-1826), congregational clergyman, the father of American geography as well as the father of Sam Morse, the inventor of the telegraph code. The Rev. Morse was the author of the first geography book published in the United States (1784).

In 1811 died: *George Bessenyei,* whose writing in Hungary started the modern awakening of the Hungarian national literature; *Louis de Bougainville,* who was the first French circumnavigator of the world. He also participated in the American War of Independence, and was commander of several ships. *Peter Simon Pallas* (d.1811) was an eminent traveller, whom Empress Catherine called to Russia. Pallas travelled through Russia, studied the Mongols and the Asian people. For his work he was made a member of the Russian Academy of Sci-

ences, received an award and an estate in the Crimea.

When we come to the 1811 births, the list of famous people becomes so large that it is a hard decision which one to include in this short outline and which to omit. We mention Achille Bazaine, marshal of France (d.1888) whom his country condemned to death (yet he escaped) because in 1870 he capitulated to the Germans. Another Frenchman, the socialist and historian *Jean Blanc* (d.1882), had a wide influence upon the organization of the workers. He denounced competitive industry, and proposed the establishment of cooperative workshops, subsidized by the State. Among the artists of this birth date we find *Theophile Gautier,* extreme romanticist painter, poet and novelist, who is celebrated for his "Mademoiselle de Maupin" (1835); *William M. Thackeray* (d.1863), author of "Vanity Fair" and of many other novels, whose power of description is unsurpassed, and who has an exceptional gift of telling a story. Two great composers were born in 1811: *Ambroise Thomas* (d.1896), who composed light operas, many cantatas and choral pieces, and *Ferencz Liszt* (d.1886), Hungarian pianist and composer, whose delightful rhapsodies are built around bits of Hungarian folk-songs. He travelled all over Europe to concerts, and royalties invited him for special performances. Ten years before his death he became the director of the Hungarian Academy of Music. One of his two daughters married Richard Wagner. Liszt's life became the topic of a motion-picture play ("Song without End") last year.

Among the 19th century scientists, Liszt's coevals were *Robert Wilhelm Bunsen* (d.1899), German chemist, who, besides the spectral analysis, had many inventions (gas burner, filter pump, ice calorimeter, gasometry, photometer, etc.); *August Bravais,* French physicist, the discoverer of the reticular structure of crystals; *Joseph B. Jukes,* English geologist, surveyor of Newfoundland, and explorer of the coasts of Australia; *Karl Reichert* (d.1883), embryologist and comparative anatomist, who also designed a microtome, and described the cartilage of the second pharyngeal arch ("Reichert's cartilage"); *Carlo Matteucci,* whose experiments with the "sheoscopic frog" are of fundamental importance; *Heinrich Haeser* (d.1884), medical historian and bibliographer, the "Sudhof" of the 19th century; *John Hutchinson* (d.1861), who invented the spirometer to measure the vital capacity of the lungs; *Thomas Curling* (d.1888), describer of a type of duodenal ulcer which is caused by extensive burns; *Sir James Young Simpson* (1811-1870) Scottish obstetrician, the great antagonist of Lister, the discoverer of chloroform anesthesia. He was a first-rate specialist, not only in the theory but also in the practice of gynecology and obstetrics to which he contributed many articles, books, and new instruments. The terms "ovariotomy," and "coccigodynia" are his creations.

In the United States, the year 1811 brought the country *Horace Greeley* (d.1872), journalist and politician, who in 1841 founded the "New York Tribune" in which he supported Lincoln and the union. *John Humphrey Noyes* (d.1886) was a "perfectionist" theologian, and founded one of the early religious communistic societies at Putney, Vermont, in which he also advocated the communal use of all women in the form of the so-called "complex marriage." Another such crazy sectarian was *Henry James Price* (b.1811), who was educated as a physician, obtained a license to practice, but gave up his profession and started an ultra-revivalist movement, claiming that he was an incarnation of deity. In 1845 he established the "Agapemone," and in his "abode of love" he and his followers lived a common life, devoted to recreation and "spiritual marriage." Among the American physicians of the same vintage, *Charles E. Isaacs* (d.1860) and *Jonathan M. Warren* (d.1867) excelled. The experiments of Isaacs with the dye excretion of the kidneys were important for the understanding of diuresis (1857). Warren's name was preserved by an operative method for the

fissure of the hard and soft palates (Boston, 1842).

A hundred years ago *Prince Albert,* consort of Queen Victoria, died from typhoid fever. He devoted his time to family life (had 9 children), and to the encouragement and promotion of science and art. *Friedrich Wilhelm,* former king of Prussia, died in the same year from a mental sickness. Other famous politicians deceased in 1861:—among them the *Count of Cavour,* minister and promoter of Italian unity, and the Polish Prince *Czartoryski,* a revolutionist against the Russian Czars. He escaped to Paris. The world mourned *Elizabeth Browning,* English poet, and a remarkable woman who at ten years of age was able to read Homer in the original, and at 14 wrote an epic. In her "The Cry of the Children" she produced an outburst over the wrongs of young children employed in the factories. Her "Sonnets" are considered the best love poems. The Englishman *Robert O'Hara Burke* (d.1861) emigrated to Australia where he became chief of police in Victoria. As such he became the first to cross Australia from the South to the North, but on his return journey he died from starvation.

A hundred years ago the medical world lost many eminent practitioners and research men. Just to mention a few of them, in France we find *Amilcar Aran* (d.1817), describer of a type of progressive muscular atrophy. In England, there were *James Braid,* Scottish surgeon, and pioneer in scientific hypnotism (a word of his making), *Sir William Burnett,* Surgeon General of the British Navy, *Sir John Forbes,* who promoted the use of stethoscope and of physical diagnosis, and translated the works of Laennec and Auenbrugger, and *John Quekett,* the microscopist. Among the German physicians, outstanding were *Friedrich August von Ammon* (1799-1861), plastic surgeon and ophthalmologist before the invention of the ophthalmoscope; *Ludwig Choulant,* bibliographer and medical historian; *Robert Froriep,* pathologist, and *Edward Siebold,* the obstetrician.

In the North American world, the first year of the Civil War brought many casualties and deaths. Among them the most famous name was *Stephen Arnold Douglas* (1813-1861), American statesman and the great opponent of Lincoln at the 1860 election. In Canada, *William L. Mackenzie* passed away. He emigrated to our Northern neighbor in 1820, and fought for Canadian independence.

One hundred years ago were born two top soldiers, the generals *Berthelot,* commanding officer of the French Army, and General *Armando Diaz,* field marshal of the Italian Army. Both excelled during the First World War. Their coevals were *Eleonora Dusé* (d.1924), Italian tragic actress, and *Radindranath Tagore,* poet, dramatist and novelist, who wrote in Bengali and in English. He was knighted in 1915, but he renounced it in 1919. Among their contemporaries we may list the following: *Alfred Whitehead* (d.1947), mathematician and philosopher; *William Bateson,* embryologist and ardent supporter of the Mendelian theory, giving early evidence that Mendel's laws are also valid in animal inheritance; *Sir Henry Head,* remarkable for his studies on the "spinal man" ("Head's zones"); *Sir Frederick G. Hopkins,* the biochemist; *Sir Almroth E. Wright,* the hematologist and describer of the opsonines (1903). *Fridtjoff Nansen* (d.1930), doctor of medicine and Arctic explorer, and *Niels Ryberg Finsen* (d.1904), Danish physician and Nobel prize winner for his phototherapy, also merit centennial birthday celebrations. In Italy, they will praise *Achille Sclavo,* who first manufactured an anti-anthrax serum, while in Russia the memory of *Dimitry Leonidovich Romanovsky* (d.1921) will be extolled. He described the malaria parasite (not the first time), and introduced a special stain into hematological research. In Germany, the devotees will light their candles for the memory of *August Bier,* known for his passive hyperemia as a method of treatment (1903); of *Economo,* for his studies of the cerebral cortex and of lethargic encephalitis; of *Adolf Kronfeld,* for his studies in comparative and folk medicine;

of *Max Nonne* ("Nonne-Appelt test"), *Karl W. Spalteholz* (his anatomical atlas), *Karl Herxheimer,* the dermatologist ("Herxheimer reaction"), *Franz Keibel,* for his classical textbook on human embryology, and *Eugen Steinach,* the rejuvenator of old men with transplantation of monkey testicles, whose name passed into the widest circle horizontally and vertically through society.

In the United States, centennial commemorations will be due to *Herbert Putman,* for many years the Librarian of the Congressional Library. Among the native physicians, the names of *William James Mayo* and of *James Bryan Herrick* remain memorable forever. William J. Mayo (1861-1939), the surgeon, was the founder of the Mayo Clinic at Rochester, Minn., together with his brother (Charles Horace). Aside from this perennial monument of his activity, he remains to be known for the many instruments and operative procedures which he devised. James B. Herrick perpetuated his name with an article which in 1912 he published in the *Journal of the American Medical Association* in which he showed that a sudden coronary attack is not necessarily fatal. Previously, he identified sickle-cell anemia (1910), and later he wrote a history of cardiology (1942).

Part 3: Memorable Books

As the memorable lives, the memorable books also depend upon the observer's point of view. Their merits are relative, and the popularity of a book does not depend necessarily upon its intrinsic value. Here again, the scale is man himself, and the sophist was right when he said that man is the measure of all things. Applying our subjective scale to books, among the gems of literature we mention first the so-called *King James' Bible* published in 1611 which for its style and other peculiarities is still considered a treasure of the English literature. Indeed, this was the Bible which the early American colonists cherished. Contemporary with this bible edition was the publication of Kepler's book on *Dioptrics* (1611) in which he developed a theory for the explanation of the rainbow, and theoretically described the first astronomical telescope. Two works from 1661 had a great popularity among the contemporaries. One was a work of *Descartes* on "The Man" (De homine), which may be considered the first physiology. The other was a play written by *Molière,* the "School for Husbands," a comedy in three acts. The work of Descartes was significant for the contemporary philosophers, and it is still considered an important stepping-stone in the progress of science. But it is now practically forgotten, while Molière's comedies are played over and over again on the stages of the modern world. Such is the fate of books!

In 1761 were published such historically and practically important scientific works as *J. P. Süssmilch's* "Divine Ordinance," which became the basis of vital statistics, *Auenbrugger's* Latin "Inventum novum"; in which he described percussion as a method of physical examination, and *Morgagni's* Latin work "On the Sites of Diseases" (De sedibus) which made him the father of pathological anatomy. Yet, a much greater, wider and more lasting influence had a little pamphlet which Simon Andér *Tissot* wrote on health in the French language and published at Lausanne in 1761. His "Warning to the People on Health" *(Avis au peuple sur la santé)* has been translated into practically all languages, and it served almost as a primer of health education throughout the 19th century and as a source of certain health superstitions even in the 20th century. The effects of Tissot's work could be quantitatively compared only with the influence of *Rousseau's* "New Héloise" which also came out in 1761. This is a novel to prove the basic thesis of Rousseau that Man is naturally good and noble. In this novel, sentimentalism is triumphant, and noble souls are shedding tears and writing long letters among beautiful mountains in Switzerland. Everything was blamed upon civilization of the mind which fettered the natural feelings of the heart. The New Héloise made sentimentalism a fashion among the ladies of the aristocracy, and among some of the men, too. France was watered

with literary and actual tears for a hundred years, and the European intellectual movement got lost for almost a century in romantic emotional literature.

In 1811 *Caspar Wistar* published the first American anatomical book. In the same year the monumental "Bibliographie de la France" was founded, a description and list of new French publications, which is still running. In 1861 came to light Bunsen's book on *Spectralanalysis,* also the work of *Ignatius Philip Semmelweis* on the "Etiology, Concept and Prevention of Puerperal Fever." From the important plays of the same year we mention the "Tragedy of Man," the great Faustian poem of the Hungarian Imre Madách. It is world history in a dramatic form, the past and the present of mankind in a gigantic antithesis. It is a horrible judgment about the dreams and enthusiasm of Man, and the attempt of a pessimistic poet to solve the meaning of Life which he looks upon as a never ending struggle.

Fifty Years Ago

Fifty years ago we read in the newspapers about the coronation of George V and Mary. France occupied Fez in Morocco, and Germany seriously protested against such expansion. That year, in August, the Mona Lisa of Da Vinci mysteriously disappeared from the Louvre. Austria felt that she had to strengthen her Army and Navy. Greece adopted a new constitution. In Portugal the first president was installed. The Russian anarchists assassinated Premier Stolypin. Serious disturbances started in Turkey, and war broke out between Turkey and Italy on account of Tripoli. In China, a revolution started against the Manchus. In Mexico, Porfirio Díaz was overthrown, and during the year the conditions of our southern neighbor remained very tense so that American troops were ordered for the protection of the Mexican border of Texas.

The United States permitted the entry of 878,587 immigrants. It was the year of 1911 during which public disesteem increased for Teddy Roosevelt. With this grew his dislike against Taft whom he saw as a failure, and he blamed himself for creating the failure. According to Roosevelt, Taft was a first-class lieutenant but never a leader. The real rift between the two men came in November when Taft started a dissolution suit against the U.S. Steel Corporation (NOTE: This suit ultimately ended in 1920 when the U.S. Supreme Court absolved the corporation). The same year resulted in the *dissolution of the big trust* which the Standard Oil Company and the Rockefeller fortune represented. Soon, the Tobacco Trust had also lost its case. The same year the New York Court of Appeals declared the Workmen's Compensation Law unconstitutional. In California, the women suffragists made a big legal conquest.

In July 1911, Upton Sinclair and others, in a socialistic colony at Arden, Delaware, were convicted of violation of the *Sunday Blue Laws,* and they were sentenced to a jail term. In the U.S. the opposition against such laws and against the Victorian spirit was steadily growing. Eliot, retiring president of Harvard University, proclaimed that people should learn more physiology, and they should get rid of the "monstrous idea that man is born in sin." *Urbanization* expanded, and it made new life conditions. City folks are not very neighborly. To counteract the urban alienation, city children were given opportunity to learn Nature in *summer camps.* More and more clubs arose whose rules included that members at their meetings should call each other by their first names.

Americans of 1911 have also become self-conscious about their *health.* People were spending more and more time in bureaus, at desks, and indoor activities and needed compensating exercises, *outdoor sleeping* to get more fresh air. In the Newark *Evening News* (April), with chattering cold lips someone summarized the new craze in these words (Sullivan):

"We are s-s-sleeping on the roof,
We are b-b-bathing on the stoop;
We are d-d-dining on the lid
Of a b-b-backyard chicken coop."

An overall concern developed about sani-

tation of public places, about spitting, and so on. There was self-accusation everywhere, a passion for a better order, and a doing everything in a hurry. A traveller in the America of 1911 wrote that "never has there been such an example of a nation sitting in judgment on itself" as America of this year. Never was a country so sure of itself not to make a war by herself than America in this year. Indeed, everything was done to *confer peace* upon others in a rather aggressive manner.

If we look through the advertisements of the Ladies Home Journal, we are amazed at seeing the large number of curious objects that women put on their heads in their *hat mania*. The favorite *topics of discussion* in the American magazines of 1911 were better tenements, improved conditions in the mines, fresh air campaigns, education on tuberculosis and other diseases, war on flies and on other insect pests, pure food, abolition of white slavery, workmen's compensation, city government, rescue of poor children, juvenile courts, police problems, agricultural improvements.

In 1911 American people were dancing the most fantastic *variations of the ragtime* which, according to the not very intricate motions, were described by such terms as the Hula-Hula dance, bunny hug, or by other animal names as grizzly bear, turkey trot, fox trot, horse trot, crab step, kangaroo dip, camel walk, fish walk, chicken scratch, lame duck and snake. Indeed, everybody was doing these crazy dances to the tune of Irving Berlin:

> "Watch them throw their shoulders in the air,
> Snap their fingers, honey, I declare,
> It's a bear, it's a bear, it's a bear! There!
> Everybody's doin' it now . . . !".

The U.S. literary market did not produce anything sensational. In the theatre, George Arliss excelled in "Disraeli," and Gilbert & Sullivan's "Pinafore" had an all-star revival.

All over the world people became conscious of *pure milk*. Milk institutes opened in several countries. The American Public Health Association introduced its standards of 1911 for milk examination. Ontario passed a bill for regulating the municipal milk supply. At Chicago a National Dairy Show was arranged at which the *biggest cheese* the world ever had seen had been exhibited. It was made by a Wisconsin cheesemaker with the assistance of many. The cheese was 5 feet high, and 8 feet in diameter. It weighed 12,361 lb. It had to be manufactured in the open air, and it took 5 hours to produce it. A special refrigerator 12 x 15 feet had to be built around it, and a specially equipped flat car was provided to ship it to Chicago.

In 1911, the Oporto and the Lisbon *universities* were founded. Universities were also opened at Fukuoka and at Reikjavik. Fifty years ago, among others, the London Biochemical Society, the International Society for Individual Psychology in Wien, and the Kaiser Wilhelm Society for the Advancement of Science in Berlin were founded. New Zealand established its Ministry of Public Health. In December, Roald Amundsen, leader of the Norwegian Antarctic Expedition, discovered *the South Pole*. Instigated by a severe plague in Manchuria, an international Plague Conference was convoked in Mukden. 1911 is also the foundation year of the famous *Health Exhibit* in Dresden.

Among the *inventions of the year* we find the pulmotor for reviving the victims of asphyxiation, the tungsten incandescent electric light, etc. In the same year, the *Rivadavia*, then the largest battleship in the world, was launched for the Argentine Navy. Among the Nobel Prize winners we find Madame Curie, who received the award (together with her dead husband) for the discovery of radium, and Gullstrand, who was rewarded for his optical researches (the slit lamp). Physicians and biologists of 1911 were first reading of tissue cultures (Carrel), dyspituitarism (Cushing), tularemia bacillus, the virus of sarcoma (Rous), about the Donnan equilibrium of ions, the isolation of bufagin (Abel), flocculation test for syphilis diagnosis (Meinicke), vitamins (Funk), etc. In Russia,

Pavlov started his studies with the conditioned reflexes.

In the United States, the year 1911 brought the establishment of the Otho S. A. Sprague Institute for Medical Research in Chicago, the Georg Crocker Cancer Research Fund, the organization of National Council for Industrial Safety. Carnegie created his largest agency, the *"Carnegie Corporation of New York"* with an endowment of 125 million for the . . . "promotion of the advancement and diffusion of knowledge and understanding among the people of the U.S." . . . It was established to exist in perpetuity and the principal of the endowment must always be conserved in toto. California at this time introduced the law for the notification of venereal diseases. 1911 was the year when the compensation insurance law was approved; when Pennsylvania created a board of movie censorship. The U.S. Dental Corps is also fifty years old.

In San Diego, a *hydroplane* rose from the surface of water and settled down again. Thus, Glenn H. Curtiss had demonstrated the practicability of his "flying boat." In the same year at St. Louis a man leaped from an aeroplane, and descended in a *parachute.* This was the first parachute leap from a height of 1,200 feet. Miss Harriet Quimby became the first American woman to get a pilot's license at the Aero-Club of America (unfortunately, next year she crashed to death in Boston). Among the *American inventions* of 1911 there was the water-proof cement and concrete, an improved ocean cable which made submarine telephony a reality, the Cadillac auto electric self-starter, etc. G. H. Lewis obtained a license for the operation of radio, and at Lake Geneva, Colonel Davidson designed a *military radio car,* equipped with telescopic masts for radio broadcasting; the current was generated by the motor of the autocar. At the Salt River, in Arizona, the *Roosevelt Dam* was completed by the U.S. government at a cost of almost $4,000,000. It was to honor Teddy Roosevelt who, throughout his entire presidency, had been a promoter of the conservation of our national resources.

Fifty years ago the scientific world mourned the *death* of *Sir Francis Galton,* founder of the science of eugenics, of *John Hughlings Jackson,* famous neurologist, of *Jacobus van t' Hoff,* the physical chemist, *Alfred Binet,* who introduced the intelligence tests, *Theodor Escherich,* bacteriologist, *Gustav Mahler,* Czech composer and conductor.

The United States lost *Joseph Pulitzer,* Hungarian immigrant journalist, whose prize is now the most esteemed award among the news writers. *William Clark Russell* (d.1911) is still delightful reading in his sea stories. *John Bigelow* was a statesman, and editor of the *New York Evening Post.* Among the medical men, fifty years ago the greatest loss was the passing of *Henry Pickering Bowditch* (1840-1911) who at the Harvard University founded the first physiological laboratory in the United States. His investigations of the contraction of the heart muscle, and of the "all-or-nothing" principle of the myocardium remain classics of modern cardiology.

The progress of civilization always requires truth, adventurous spirit, and artfulness. Remembrance of the past has been an eternal stimulus for a better future. When the Greek sophist says that each moment of experience is a transition between two worlds he should have also added that today's struggle is the necessary condition for tomorrow's success. Many things happened at all ages of mankind which made the outcome questionable. It is indeed the tragedy of Adam that all his good intentions and achievements throughout history seemed to come to a catastrophic end; yet, a mystic innate power urged him on for further adventure and further struggle, as if the Creator would encourage him (with the poet's words):

> "Man! Keep on struggling, and have a firm confidence in me!"
>
> (MADACH: The Tragedy of Man, 1861.)

EDITORIALS

Where Do We Stand?

RECENTLY President Eisenhower told us that our gold reserves were in a precarious position. The spending by the Federal Government in foreign lands together with the dollar outflow from millions of our people who have been visiting in foreign lands, all of which has been going on for some fifteen years, has raised some questions about our financial condition when measured in gold. This is just what our communist contemporaries had hoped for.

To combat some of this outflow of our money many dependents will be brought back from overseas stations. This is a bitter pill prescribed in the therapy of a condition which *must,* however, be remedied. There are other measures that must be taken.

There is a facet which is not too well known but which affects our industry, particularly that supporting the medical profession and its allied professions. For some years now the surgical instrument people have found it necessary to look to foreign markets for their supplies. This has led to a condition in which our own U.S. manufacturers have had to close their plants. Does this leave us vulnerable in case of a national emergency?

Also recently we have seen a government agency give a large order for drugs to a foreign nation, a non-respecter of patents.This means an outflow of gold from our country. More than that, this policy is a blow struck at our own pharmaceutical industry. Continued blows of this type can play havoc with an industry which spends over two hundred million dollars annually for research in the competitive efforts of its members to give us the drugs needed in this ever continuing battle against disease. Sure we want to be charitable but let's be sensible.

Penny wise and pound foolish! We think we are saving money. Where will this lead us eventually but to catastrophe? If our industry is ruined because of our own lack of support of it do we have any complaint to make with industry when it cannot produce in a national emergency? This puts us in mind of the Biblical expression, "If the salt has lost its savor wherewith shall it be salted?"

For our own national security let's spend our appropriated dollars for drugs and instruments of our own manufacture.

Honors Night Dinner

ON THE opposite page we give you the picture of the Honors Night Dinner held at the Mayflower Hotel, Washington, D.C., November 2, 1960. This is a panoramic photograph since any other type would not have done justice to the 540 persons who were present.

If you will place the lower left hand section (as you turn the page sideways) to your left, and the lower right hand section to your right, of the upper part you will have the picture of the Grand Ballroom on that night.

Those at the head table, our guests of honor, are standing.

Captitol Photo

The Association of Military Surgeons of the United States

Founded 1891, Incorporated by Act of Congress 1903

Suite 718, New Medical Bldg., 1726 Eye Street, N.W., Washington 6, D.C.

Telephone NAtional 8-2206

Official Journal: MILITARY MEDICINE

EXECUTIVE COUNCIL—1961

President:
LEROY E. BURNEY
Surg. Gen., USPHS

First Vice-President:
MAJ. GEN. JAMES P. COONEY
MC, U. S. Army

Second Vice-President:
REAR ADM. CALVIN B. GALLOWAY
MC, U. S. Navy

Third Vice-President:
COL. ROBERT C. KIMBERLY
MC, Md. NG

Fourth Vice-President:
WILLIAM S. MIDDLETON, M.D.
Chief Med. Dir., Vet. Adm.

Fifth Vice-President:
MAJ. GEN. M. SAMUEL WHITE
U. S. Air Force (MC)

Sixth Vice-President:
BRIG. GEN. FRANK E. WILSON
MC, U. S. Army, Res.

Secretary-Editor
COL. ROBERT E. BITNER
U. S. Army, Ret.

Dental Section Chairman:
BRIG. GEN. L. C. FAIRBANK
U. S. Army, Ret.

Veterinary Section Chairman:
BRIG. GEN. J. A. MCCALLAM
U. S. Army, Ret.

M. S. C. Section Chairman:
COL. BERNARD KORN
USAF, MSC

Nurse Corps Section Chairman:
MISS CECILIA H. HAUGE
Director, Nursing Service, Vet. Adm.

Medical Specialist Corps Section Chairman
LT. COL. MYRA L. MCDANIEL
AMSC, U. S. Army

Chapter Section Chairman:
DR. SAMUEL CANDEL
NY Chapter

Executive Secretary (Ex Officio)
LT. COL. GEORGE M. BEAM
AUS, Ret.

THOMAS A. FOSTER, Pharm. Dir. USPHS
COL. EDMUND G. BEACHAM, MC, Md. NG

A. B. C. KNUDSON, M.D. (VA)

BOARD OF TRUSTEES, RETIREMENT FUND

BRIG. GEN. L. C. FAIRBANK, USA, Ret., Chm. BRIG. GEN. J. A. MCCALLAM, USA, Ret., Treas.
JAMES P. LEAKE, Med. Dir. USPHS, Ret., Secretary

LIVING PAST PRESIDENTS

(Rank held at time of office)

ASST. SURG. GEN. JOHN W. KERR, USPHS (1921)
ASST. SURG. GEN. RALPH C. WILLIAMS, USPHS (1933)
SURG. GEN. THOMAS PARRAN, USPHS (1939)
MAJ. GEN. CHARLES R. REYNOLDS, MC, USA (1940)
COL. JAMES A. MATTISON, Vet. Adm. (1942)
COL. LUCIUS A. SALISBURY, MC, N.Y., NG (1944)
ASST. SURG. GEN. WARREN F. DRAPER, USPHS (1947)
VICE ADM. JOEL T. BOONE, MC, USN (1949)
COL. WILLIAM H. TRIPLETT, MC, Md., NG (1950)
COL. ROBERT C. COOK, MC, AUS, Vet. Adm. (1951)
MAJ. GEN. HARRY G. ARMSTRONG, USAF (MC) (1952)
SURG. GEN. LEONARD A. SCHEELE, USPHS (1954)
REAR ADM. W. DANA, MC, USN (1956)
BRIG. GEN. AMOS R. KOONTZ, MC, Md., NG (1957)
COL. CHARLES R. MUELLER, U. S. Army, Ret. (Vet. Adm.) (1958)
MAJ. GEN. H. H. TWITCHELL, USAF, MC (1959)
REAR ADM. RICHARD A. KERN, MC, USNR, Ret. (1960)

SUSTAINING MEMBERS

It is a privilege to list the firms who have joined The Association of Military Surgeons as Sustaining Members. We gratefully acknowledge their support.

ABBOTT LABORATORIES
AMERICAN STERILIZER COMPANY
AMES COMPANY, INC.
ASTRA PHARMACEUTICAL PRODUCTS, INC.
AYERST LABORATORIES
BAXTER LABORATORIES, INC.
BECTON, DICKINSON AND COMPANY
BURROUGHS WELLCOME & CO. (U.S.A.) INC.
CIBA PHARMACEUTICAL PRODUCTS, INC.
COOK-WAITE LABORATORIES, INC.
CUTTER LABORATORIES
EATON LABORATORIES, DIVISION OF THE NORWICH PHARMACAL CO.
GENERAL ELECTRIC COMPANY
HOFFMANN-LA ROCHE, INC.
LEDERLE LABORATORIES DIVISION, AMERICAN CYANAMID CO.
LILLY, ELI, AND COMPANY
MALLINCKRODT CHEMICAL WORKS
McNEIL LABORATORIES, INC.
MEAD JOHNSON & COMPANY
MERCK SHARP & DOHME
ORTHOPEDIC EQUIPMENT COMPANY
PARKE, DAVIS & COMPANY
PFIZER, CHAS. & CO., INC.
PICKER X-RAY CORPORATION
RITTER COMPANY, INC.
ROBINS, A. H., COMPANY, INC.
SCHERER, R. P., CORPORATION
SCHERING CORPORATION
SEARLE, G. D., & CO.
SMITH KLINE & FRENCH LABORATORIES
SQUIBB, E. R. & SONS, DIVISION OF OLIN MATHIESON CHEMICAL CORP.
STEPHENSON CORPORATION
UPJOHN COMPANY, THE
WARNER-CHILCOTT LABORATORIES
WINTHROP LABORATORIES, INC.
WYETH LABORATORIES

Around the World

(Ser. IV, No. 1)

By
CLAUDIUS F. MAYER, M.D.

AUSTRALIAN women have been experiencing a very curious change since 1945 which has no parallel in other parts of the world. There has been an abrupt rise in the incidence of, and mortality from, chronic gastric ulcer among women under the age of 40 years, coinciding with a drop in the male mortality rate. The usual male/female ratio of this disease is 2:1. This was the ratio in Australia until 1940. Now, the forecast is that by 1965 the rate will be the opposite, i.e., 1 male patient with gastric ulcer to 2 female patients. A member of the Gastro-Intestinal Clinic of the Sydney Hospital finds that the *increase in ulcer among Australian women* started with the second half of World War II. At the same time, the number of perforated ulcers has also increased. What might be the cause of this curious phenomenon? Nobody knows. The suspected "environmental factors" have not yet been found.

Ruanda-Urundi is just about one twentieth of the area of the whole Congo. It is just about as thickly populated as certain territories of Europe. The inhabitants do not hunt much, but they like to fish; and fishing is one of the chief resources of the country. Usumbura, where the governor formerly resided, produces coffee and a little cotton. Large cattle herds graze along the shores of Lake Tanganyika. The cows produce but little milk, and the traction role of the oxen is taken over by female labor.

The thick population of Ruanda-Urundi requires a well organized *medical service.* The Belgian Government had created 35 hospitals, 156 dispensaries, 41 maternity wards, and 2 sanatoria. All these institutions were directed by Europeans educated in Belgium. What happened to them, we do not know exactly. Protestant and Catholic missions also had a few medical centers. Specialists directed the fight against various epidemics. Due to the abundant use of DDT, the mosquito is now very much reduced in the towns, and the flies have almost completely disappeared. One could dine at night at an open terrace, without seeing a single bug around the lamplight.

The chief scourge of *Ruanda-Urundi* is *tuberculosis.* The tuberculin tests show that at the age of 5 years, 15% of the children have been infected. Radiological examination of the population showed the presence of active tuberculosis in 3.5% of children below 5 years of age, and in 3% of the children aged 6-10 years. It was decided that only a wholesale vaccination of the people would help, since it is practically impossible to separate the contagious cases; moreover, more than 34% of the tuberculosis in Ruanda-Urundi is of bovine origin.

The Belgian Government used to do everything to improve the *nutrition of the native people.* One problem is to preserve the fish which are caught in the Lake Tanganyika. The native methods of drying the fish are unsatisfactory. European experts tried to catch the carbon dioxide gas which develops at the bottom of the Lake; this gas, then, could be used for the production of dry ice, suitable for the refrigeration of fish. This could have made also the transportation of fish possible into the interior of the country. Another addition to the native diet was made by preparing *yoghurt from soya-bean milk.* A third addition concerned the *beer made from banana.* It contains a large amount of vitamin B, but it is somewhat toxic. A Belgian biochemist had also prepared delicious *banana wine* by fermentation, with the hope that it would push the beer out of the market.

Among the *nervous diseases,* epilepsy is quite frequent here, as also elsewhere in Africa, as a sequela of birth injuries, or of infections at the perinatal period. At the Usumbura General Hospital, the mentally ill are

treated at the *psychiatric ward* without segregation. It also became customary to send criminals to this ward for a longer or shorter period of observation. All in all, Africa is indeed moving from the pastoral era to that of the engineers, from the era of the witch doctors to the era of 20th century physicians.

In the *Argentinan Army,* medical officers made a survey of the geographical variations in the *blood chemistry of young soldiers.* They had mobile laboratory equipment in which the various values of blood protein and blood lipids were determined in soldiers stationed at several garrisons of North-East and North-West Argentina. One of the chief goals of this study is the recognition of the different changes which will occur in the healthy organism after immunizations.

In a hospital at Ilesha, *Western Nigeria,* a survey was made of the *newborn babies* whose mothers had malaria and whose placenta often (30%) contained malarial parasites. The survey showed, however, that malaria was not a congenital disease. The peripheral blood of these babies contained *no malarial plasmodia.* While such a resistance cannot be fully explained, it also became evident that most babies of the malarial mothers were lighter in weight, and some of them were prematurely born.

An English malaria reference laboratory cautions that many of the *young Negro immigrants* arriving in Great Britain from holo-endemic malarious regions of Africa, such as e.g., Nigeria, may *harbor quiescent malaria parasites* in their blood, especially during the first six months of immigration. It is still unknown how long the *plasmodia are able to survive* in the human host in the absence of reinfection, and when the carrier settles down in a temperate zone. Yet, recently in a London hospital, a patient developed falciparum malaria after a blood transfusion whose donor was a young Nigerian medical student who arrived a few months before from Lagos. Subsequently, it took a three-hour search of the thick films from his blood until a few merozoites of the Plasmodium falciparum could be found under the microscope. Here belongs also the observation that a young Nigerian athlete *died after a knockout blow* in the ring; his blood also contained typical ring forms of the falciparum parasite.

A British report on *narcotic drugs* listed only 359 *addicts in England,* of who 149 were addicted to morphine, 74 to pethidine hydrochloride, 52 to heroin, and the balance to a miscellany of drugs. Unfortunately, 75 of the reported addicts belong to the medical and allied professions. Statistical figures of admissions to British mental hospitals also show that the drug addiction is not a great problem in the British islands. This is also evident from another source of information, namely from the data of the British Prison Commission. There is little relationship between crime and narcotic addiction in England. Indeed, there are very few peddlers and pushers of narcotics, and, at least according to the statement of law enforcement officials, organized crime, such as we know in the U.S., does not exist in England. The addicts prefer morphine to heroin in a ratio of about 10 to 1, despite the fact that English physicians are free to prescribe heroin. Under international pressure, the Home Office took some tentative steps toward banning heroin in England, but the British Medical Association began to fight valiantly against this invasion of what it considers professional prerogatives."

One of the last September issues of the British medical Journal contains a *selection of hospital photographs* from England and from other parts of the world, showing the experiment and progressive trends in *hospital building* in recent years. The collection starts with a reproduction of the bronze figure of the legendary *Princess Macha,* of the Golden Hair, who is reputed to have founded the first hospital in Ireland in 300 B.C. The figure is placed near the main entrance to Altnagelvin Hospital, Northern Ireland. We see Mexico City's new 34 million dollar medical center which will comprise 13 buildings with over 2,000 beds, and will be serviced by a staff of 4,000 people. There is the beautiful *Hospital Sul America* in Rio (1956) whose wards overlook Lake Rodrigo. Another view

brings us the new *Stanford Medical Center* at Palo Alto, Calif., which has four medical and three hospital buildings interconnected by arcades and covered ways, and is designed around reflecting pools, fountains, trees, open courtyards and patios. We see the experimental circular wing of the *Valley Presbyterian Hospital* of Los Angeles in which the patients' rooms are grouped in a futuristic way around a central service core, and whose windows can be shaded by aluminum shutters. The St. Lô Hospital, France (1956) was built as a memorial to American soldiers, killed during the liberation of France, and was planned in accordance with the findings of the U.S. Public Health Service. We marvel about the *operating theater of the Edinburgh* Western General Hospital's Surgical Neurology Unit; in this theater the air is changed 21 times in an hour. The ceiling is an egg-shaped, pressurized dome with operating lights 10 times as powerful as normal theater lights, with ventilation grilles, and viewing ports. It is also equipped with a five-way radiographic viewing box, a magnetic lighting-control panel, oxygen, nitrous oxide suction, nitrogen for compression tools, electroencephalographic connections, and television for the transmission of encephalographic recordings.

Outbreaks of rabies caused by the bite of infected *bats* have been known in the Americas for several years. This animal is a dangerous carrier of rabies also in the European countries. During recent years, cases of rabies of unknown origin have been described in Hungarian and Yugoslav cattle. The brains of bats caught in the Voivodina District of Eastern *Jugoslavia,* especially in a small woods near Novi Sad, contained rabies virus, as it had been proved by members of the Pasteur Institute of that city. The virus caused an atypical meningo-encephalitis in the inoculated experimental animals.

On the other hand, rabies has become so rare among people in Hungary, that the *Pasteur Institute* (est. 1890) *and Hospital* (est. 1904) *of Budapest* was closed in 1941. There was just no further need for it. From all over Hungary, people who were bitten by mad dogs were sent to this center where they received the inoculations with a *rabies vaccine* prepared in the institute. The vaccine's make was originally by Endre Högyes, Hungarian pupil of Pasteur. The methods of rabies control have changed meanwhile, and centralized treatment is not required any longer. The preparation of the vaccines was also assigned to the Hungarian National Insitute of Health. During its 51 years of existence, the Pasteur Institute of Budapest saw 314,366 patients who were saved by inoculation with the domestic antirabies vaccine. During this period of time, only 737 persons died of rabies in Hungary, where the latest case of human rabies was seen in 1948.

The *science of virology* made great advances all over the world, especially during the past few years. Two decades ago only a dozen or two dozen viruses could be cultivated in the laboratories. Now, we have a long list of at least 150 different viruses which are labelled and which may infect man, and can be readily studied in the laboratories. Even the *grouping of the virus species* seems now a formidable task. We have such *families* as the basophilic group related to the psittacosis virus, the hemagglutin myxoviruses (including the influenza types), the arbor viruses (a big group, including a number of obscure fevers and hemorrhagic fevers), the enteroviruses (Coxsackie and Echo), the adenoviruses, etc. The recent virological contributions were made possible by the development of newer tissue-culture technics.

In England, at the Common Cold Research Unit, Salisbury, Wilts, an *International Reference Center for Respiratory Viruses* has been established as a part of the WHO reference laboratories system. This center will cooperate with the World Influenza Center, established some time ago in London. The purpose of these reference laboratories or centers is to maintain some order in the classification and naming of the many respiratory viruses which are now identified. The center will deal with myxoviruses, adenoviruses, enteroviruses, associated with respiratory infections, common cold viruses,

and such organisms as "reoviruses" and respiratory "syncytial viruses."

Kuru, the New Guinean disease, which involves a rapidly progressive disorder of the cerebellar function, is of unknown origin, and it continues to kill about one-half of the females and one tenth of the males in many parts of the region concerned. *Genetic investigations* suggested that it is a gene-determined disease. Mothers of male kuru victims almost always died from the disease themselves. It is assumed that kuru is under the control of a single pair of autosomal alleles. The alleles are *Ku and ku.* In females the homozygotes KuKu are potential "early-onset" victims, the heterozygotes Kuku are "late onset" victims. In males, the homozygotes KuKu are victims of kuru, and the heterozygotes Kuku are clinically normal.

Epidemic vertigo is a rather common ailment, as some of us can tell from our own experience. It comes suddenly in the form of light-headedness, slight dizziness, and a gait with widely set legs like the sailors. A feeling of some nausea, or plain vomiting may also occur. Sometimes, it is so severe that people are confined to bed for safety. But even in the bed, any movement of the head may give rise to the recurrence of vertigo. Such epidemics were described in *Denmark.* A similar small epidemic occurred this fall (1960) in *Washington, D.C.* In true epidemic vertigo, the symptoms arise probably by some kind of virus infection, although no organism was ever isolated. Someone suggested that the second vestibular neurone is primarily involved, possibly in the brain stem. The initial symptoms subside in a few days, but there may be further recurrent vertiginous episodes of diminished severity for several weeks or even for months, sometimes associated with persistent lassitude and depression. Other combinations are with gastrointestinal upset, or with upper respiratory infection, perhaps with some changes in the cerebrospinal fluid. Treatment is by antihistaminic drugs, and perhaps with anti-depressants. The prognosis is excellent for complete recovery.

The *Minister of Health of India* gave an account of the progress of the *health programs* in his country. The infant mortality rate dropped from 160 per 1,000 to 100 per 1,000. The general mortality rate, which was between 20 to 25 per thousand in the last decade, is now 10 to 12 per thousand. Thus, the life expectancy of the Hindu grew from 32 to 42 years. The essence of the Indian health programs is prevention. The *results of preventive efforts,* however, do not show up right away. In the matter of tuberculosis, the Minister said that even if all the hospital beds in the country were set aside for tuberculotics, there would *not be enough to treat* "25 lakh" (2½ million) cases; hence, the efforts are concentrated not on treatment but on prevention and on limiting the spread of the infection. Expert workers are also wanted for anti-tuberculosis work. Hence, the *National Tuberculosis Institute* had been established in Bangalore for the training of doctors, nurses, health visitors, social workers, and technicians. Numerous BCG injections were given. Another disease, the malaria, offers more hope for its eradication. Filariasis is also dealt with through mass treatment campaign by means of mobile teams. There is also hope that people can be vaccinated, and revaccinated against smallpox.

Histoplasmosis is widespread all over the world. Many cases of the benign primary form were observed along the valleys of North-American rivers, the *Mississippi and the Ohio.* There are many positive reactors to histoplasmin in *Mexico and Panama.* The disease also exists in *Australia* and in certain northern countries of *Europe.* A recent pilot survey in the *Delhi* area shows that histoplasmosis is also more frequent in India than hitherto believed. Members of the Delhi University discovered 12.3% positive reactors in the area of the Jumna River.

Lathyrism has been prevalent in India for a long time. In an epidemic form it has been reported during the past fifty years from the Central Provinces, United Provinces, Punjab, etc. It is mainly confined to a belt which runs across Madhaya Pradesh, the East of the United Provinces, and Northern Bihar.

As a study at the *Lucknow Hygiene Institute* shows, *Lathyrus sativus* (: or khesari, in Hindu) is mainly consumed by landless laborers, or by small holders. Most of the cases of lathyrism occur in August, September and October. The affection starts suddenly. The patient feels heaviness of the legs, with inability to walk, or with cramps in the calf muscles. In some cases, muscular wasting may also develop. Once the symptoms blossomed, the chances of regression are remote. The exact cause of the disease is still unknown (methionine deficiency? perhaps combined with vitamin C deficiency?).

The *Viet-Nam* government received much aid from the Red Cross for the *rehabilitation of its disabled soldiers.* The government obtained the initial aid to set up a center for the manufacture of artificial limbs in Saigon. It also received technical helpers as early as 1955 December. The originally small establishment, which was arranged within the premises of Saigon Hospital, grew larger, and, a few years ago, it started to supply the Kingdom of *Laos with artificial limbs* also. The center is under military management, with a medical officer and an orthopedic specialist on the staff. New buildings were erected for the purpose of rehabilitation. They are located at the site of a former army camp. The center is now able to provide professional training, surgical work, and a training hall for the amputees. The artificial limb workshops are now producing 30-40 artificial limbs a month as well as orthopedic footwear and crutches.

The centralized character of *national medical research in the U.S.S.R. is shown* by a list of the medical institutes which receive their central guidance and programming from the Academy of Medical Sciences. Here are these national *medical research institutes in Russia* (we give in parenthesis the present heads of the different establishments as of September 1960): 1. Institute (let us abbreviate this word to I.) of Experimental Medicine (D. A. Biryukov); 2. I. of Normal and Pathological Physiology (V. N. Chernigovsky); 3. I. of the Brain (S. A. Sarkisov); 4. I. of Pharmacology and Chemotherapy (V. V. Zakusov); 5. I. of Biological and Medical Chemistry (V. N. Orehovich); 6. I. of Experimental Biology (I. N. Maisky); 7. I. of Experimental Pathology and Therapy (B. A. Lapin); 8. I. of Neurology (N. B. Konovalov); 9. I. of Psychiatry (D. D. Fedotov); 10. I. of Therapy (A. L. Myasnikov); 11. I. of Pediatrics (O. D. Sokolova-Ponomareva); 12. I. of Tuberculosis (N. A. Shmelev); 13. I. of Infectious Diseases (I. L. Bogdanov); 14. I. of Experimental Pathology and Therapy of Cancer (N. N. Blohin); 15; I. of Oncology (A. I. Serebrov); 16. I. of Neurosurgery (B. G. Egorov); 17. I. of Thoracic Surgery (S. A. Kolesnikov); 18: A. V. VISHNEVSKY I. of Surgery (A. A. Vishnevsky); 19. I. of Obstetrics and Gynecology (P. A. Beloshapko); 20. I. of Hygiene of Work and of Occupational Diseases (A. A. Letavet); 21. A. N. SYSIN I. of Public and Communal Hygiene (N. N. Litvinov); 22. I. of Nutrition (O. P. Molchanova); 23. N. F. GAMALEI I. of Epidemiology and Microbiology (S. N. Muromtsev); 24. D. I. IVANOVSKI I. of Virology (P. N. Kosyakov); 25. I. for the Study of Poliomyelitis (M. P. Chumakov); 26. I. for the Search of New Antibiotics (S. D. Yudintsev, now dead).

A *hemophiliac research worker in England* who was much plagued by the ups and downs of bleeding episodes, and especially by severe incidents of hemarthrosis, reported that he was able to *abort the attacks* of bleeding into his joints by the *eating of peanut* or of peanut flour. Continuous taking of peanut seemed to prevent the attacks entirely. The effective substance seems to be in the residual peanut meal obtained after extraction with hexane. Other hemophiliacs should also try this simple method. Indeed, they should do so with the assistance of their doctors so that objective records could be made of the results. . . . *Multa paucis*! And a Happy New Year.

The Sir Henry Wellcome Medal and Prize

COMPETITION FOR 1961

THE competition is open to all medical department officers, former such officers, of the Army, Navy, Air Force, Public Health Service, Veterans Administration, The National Guard and the Reserves of the United States, commissioned officers of foreign military services, and all members of the Association, except that no person shall be eligible for a second award of this medal and prize and no paper previously published will be accepted.

The award for 1961, a medal, a scroll, and a cash prize of $500, will be given for the paper selected by a committee composed of the Association's vice-presidents which reports on the most useful original investigation in the field of military medicine. The widest latitude is given this competition, so that it may be open to all components of the membership of the Association. Appropriate subjects may be found in the theory and practice of medicine, dentistry, veterinary medicine, nursing and sanitation. The material presented may be the result of laboratory work or of field experience. Certain weight will be given to the amount and quality of the original work involved, but relative value to military medicine as a whole will be the determining factor.

Each competitor must furnish six copies of his paper which must not be signed with the true name of the author, but are to be identified by a *nom de plume* or distinctive device. These must be forwarded to the Secretary of the Association of Military Surgeons of the United States, Suite 718, 1726 Eye St. N.W., Washington 6, D.C., so as to arrive at a date not later than 15 June 1961, and must be accompanied by a sealed envelope marked on the outside with the fictitious name or device assumed by the writer and enclosing his true name, title and address. The length of the essays is fixed between a maximum of 10,000 words and a minimum of 3000 words. After the winning paper has been selected the envelope accompanying the winning essay or report will be opened by the Secretary of the Association and the name of the successful contestant announced by him. The winning essay or report becomes the property of the Association, and will be published in MILITARY MEDICINE. Should the Board of Award see fit to designate any paper for "first honorable mention" the Executive Council may award the writer life membership in The Association of Military Surgeons, and his essay will then also become the property of the Association.

NOTES

Timely items of general interest are accepted for these columns. Deadline is 1st of month preceding month of issue.

Department of Defense

Ass't Secretary (Health & Medical)—HON. FRANK B. BERRY, M.D.

Deputy Ass't Sec'y—HON. EDW. H. CUSHING, M.D.

LIFE COLLECTION OF WAR ART

The 1,050 oil paintings, drawings and water colors in the *Life* War Art Collection have been presented to the Department of Defense for permanent safe-keeping and display.

Display of this collection will be made in the main corridor leading from the Mall Entrance at the Pentagon with frequent changes until the entire 1,050 pieces of art have been shown.

The work of 54 men is represented in this collection. One artist commissioned for the work is not represented in the collection. Lucien Labaudt shortly after his arrival in India lost his life in the crash of the first plane he ever boarded. Another, Edward Laning, was seriously wounded in Italy. The men believed in their mission and braved danger to do their job.

EPIDEMIOLOGICAL BOARD

The Fall Meeting of the Armed Forces Epidemiological Board was held on December 6, 1960 at the Walter Reed Army Institute of Research, Walter Reed Army Medical Center.

Representatives of the military medical services, National Research Council, Public Health Service, Office of the Assistant Secretary of Defense (Health and Medical), Office of Civil Defense Mobilization, Army Environmental Hygiene Agency, and the Walter Reed Army Institute of Research were present.

The Board meets twice a year to advise the military medical services on matters of epidemiological research and preventive medicine.

ARMED FORCES

On September 30, 1960 the strength of our Armed Forces was given as 2,492,474.

DEPENDENTS TO RETURN TO U. S.

The Military Departments are proceeding with their plans for implementing President Eisenhower's recent directive to the Defense Department to reduce the number of dependents of military and civilian personnel in foreign countries and maintain them at a level not exceeding 200,000.

The program began on January 1 and is to be completed in 19 months.

For planning purposes, the Military Departments have been supplied approximate interim net figures as to their share of the 15,000 per month total to be returned to the United States. These figures are: Army—7,710; Navy and Marine Corps—1,170; Air Force 6,120.

JAPANESE INTERNES

Thirty-eight qualified graduates of Japanese medical schools approved by the Ministry of Health and Welfare, were recently accepted for internship at four U. S. Forces hospitals in Japan, starting April 1, 1961.

These hospitals are the U. S. Naval Hospital, Yokuska; 6022 U. S. Air Force Hospital, Johnson Air Base; U. S. Air Force Hospital, Tachikawa Air Base; and the U. S. Army Hospital, Camp Zama.

The selected examinees underwent physical examinations, a written medical exami-

U. S. Army Photo

Interviewing an Applicant for Internship. (*L to R*) CAPTAIN HARRY A. WEISS, MC, USN; LT. COL. JOHN F. TRACEY, USAF, MC; MAJ. HARVEY W. PHELPS, MC, USA; LT. COL. ROBERT B. W. SMITH, USAF, MC; DR. RUEDA.

nation in English and oral interviews by a board of medical officers from the three services sponsoring the medical program.

Army

Surgeon General—LT. GEN. LEONARD D. HEATON

Deputy Surg. Gen.—MAJ. GEN. THOMAS J. HARTFORD

DENTAL CHIEF HONORED

Major General Joseph L. Bernier, Assistant Surgeon General of the Army and Chief of the Army Dental Corps, recently received the Distinguished Alumnus Award from the University of Illinois Dental Alumni Association.

General Bernier organized the American Academy of Oral Pathology in 1946, and founded the American Board of Oral Pathology ten years ago.

ADVISORY COUNCIL ON RESERVE AFFAIRS

The Surgeon General's Advisory Council on Reserve Affairs met in December in the Office of the Surgeon General.

The Council which meets yearly to deal with problems concerning the Army medical reserve and to advise the Surgeon General on reserve affairs that affect the nation's health professions, is composed of the following Members: Brig. Gen. Alexander M. Marble (Chairman) and Brigadier Generals Frank E. Wilson, Harold G. Scheie, Carl S. Junkermann, Truman G. Blocker, Jr., Thomas P. Fox, Joseph M. Bosworth, David E. Mayer, James H. Kidder, and John B. Lagen.

ASSIGNMENT

Pharmacist, artillery officer, physician, and flight surgeon Henry D. Gallo was recently assigned to the Physical Standards Division, Directorate of Professional Service, Surgeon General's Office.

Captain Gallo earned a BS in Pharmacy from the University of Florida in 1952 and then was called to active duty as an artillery officer for service in the Far East. In 1955 he returned to the University of Miami where he continued his medical education and received his MD in 1959.

ASSIGNMENT

Major James B. Young, a Veterinary Corps nuclear scientist, has been assigned to the Division of Nuclear Energy of the Research and Development Command. He was previously with the Walter Reed Army Institute of Research.

A graduate of Texas A. & M, Major Young served in the Chinese-Burma-India area in World War II. He has taught in the U. S. Army Medical Service Meat and Dairy Hygiene School in Chicago. He earned his Masters Degree in Radiation Biology at the University of Rochester, and then attended the Command and General Staff College associate course, and while there took the Nuclear Weapons Employment Course.

Also assigned to the Research and Development Command is Major James C. Beyer, MC, co-author of a number of papers on wound ballistics and body armor. He will continue his work in this general area in his new position.

NEW ASSIGNMENT

Colonel Clark B. Williams, former Executive Officer at Brooke Army Medical Center,

is the new Commanding Officer of the U. S. Army Hospital at Fort Campbell, Ky.

On his departure from the Brooke Army Medical Center, Colonel Williams was awarded the Army Commendation Medal (First Oak Leaf Cluster) by Major General John F. Bohlender, Commanding General of the Center.

RESOLUTION

We are happy to publish the resolution adopted by the Board of Managers, Walter Reed Memorial Association, of which Major General Paul H. Streit, U. S. Army, Retired, is Secretary:

WHEREAS, Colonel Joseph F. Siler died on February 7, 1960, in Washington, D.C., after a long and distinguished career in Medicine and scientific research; and

WHEREAS, Colonel Siler was Secretary of the Walter Reed Memorial Association from November 1941 until 1950, and as such performed important services in recording, rewording and re-assembling the many important documents associated with the proceedings of the Association, and otherwise performed the duties of Secretary in a most exemplary manner; and

WHEREAS, Colonel Siler as President of the Walter Reed Memorial Association from 1950 till his death in 1960, served the Association with outstanding leadership and enthusiasm;

Now Therefore, Be it Resolved,

1. That the Board express the deep sense of loss suffered by the Association and its Board of Managers in the death of Colonel Siler.

2. That the Board express its gratitude and thanks to Mrs. Frazier, sister of Colonel Siler, for his outstanding services as Secretary and President during his tenure of office.

3. That a copy of this Resolution be incorporated into the regular Minutes of the Association.

4. That a copy of this Resolution signed by the Secretary, be forwarded to Mrs. Frazier.

5. That a copy of this Resolution be forwarded to MILITARY MEDICINE.

The resolution was dated November 8, 1960.

Your editor served in the Health Department of the Canal Zone when Colonel Siler was Chief Health Officer. All regarded him as a great officer, gentleman, and scholar.

RECORDED ORIENTATION

A recorded orientation for patients with hepatitis has been adopted at the 48th Surgical Hospital, Seoul, Korea.

This material has been organized to aid the patients in the understanding of the disease and what precautions must be taken to prevent the spread of hepatitis and a relapse or complications after return to duty.

The tape recording is the combined work of Captain MacDonald Poe, Jr., MC, Hospital Commander, Captain Pettrina Mead, ANC, and Captain Veronica Voyce, ANC.

OCCUPATIONAL THERAPY TRAINING

Summer training with pay is planned to give occupational therapy students experience in major Army hospitals.

Known as the *Occupational Therapy Summer Practicum,* this program will be offered to unmarried female occupational therapy students who have completed their junior years in college. The program is for three weeks, July 17-August 4.

Hospitals tentatively scheduled to conduct this program are: Brooke General Hospital, Ft. Sam Houston, Texas; Fitzsimons General Hospital, Denver, Colo.; Letterman General Hospital, San Francisco, Calif.; Madigan General Hospital; Tacoma, Wash.; Valley Forge General Hospital, Phoenixville, Pa.; William Beaumont General Hospital, El Paso, Texas; and Walter Reed General Hospital, Washington, D.C.

Applications should be sent to The Surgeon General, Department of the Army, Washington 25, D.C., ATTN: MEDCM OP, by February 1.

Navy

Surgeon General—REAR ADM. BARTHOLOMEW W. HOGAN
Deputy Surgeon General—REAR ADM. EDWARD C. KENNEY

RADIOBIOLOGICAL RESEARCH INSTITUTE

Ground was broken on November 29 at the National Naval Medical Center, Bethesda, Maryland, for the Armed Forces Radiobiological Research Institute.

Those officiating in the ceremony were Dr. Frank B. Berry, Assistant Secretary of Defense (Health and Medical); Rear Admiral Bartholomew B. Hogan, The Surgeon General of the Navy; Rear Admiral F. P. Kreuz, Commanding Officer of the Medical Center; Major General T. J. Hartford, Deputy Surgeon General of the Army; Brig. General A. L. Jennings, Director of the Directorate of Professional Services, Office of the Surgeon General of the Air Force, and Brig. General R. H. Harrison, Deputy Chief, Defense Atomic Support Agency, Department of Defense.

The Institute will be under the sponsorship of the Defense Atomic Support Agency for advanced study and research in the biomedical effects of radiation.

This is the first pulse type reactor designed solely for medical research. It will be built by the General Dynamics' General Atomic Division at San Diego and will cost about $2,400,000.

The reactor will produce controlled, split-second pulses of high intensity neutron and gamma radiation. Controlled laboratory conditions will make possible research not possible during field testing of atomic weapons.

U. S. Navy Photo

Dr. Berry breaking ground for Armed Forces Radiobiological Institute. (*L to R*) RADM. F. P. KREUZ, MC, USN; DR. FRANK B. BERRY; BRIG. GEN. A. L. JENNINGS, USAF, MC; RADM. B. W. HOGAN; MAJ. GEN. T. J. HARTFORD, MC, USA; BRIG. GEN. R. H. HARRISON, USA.

ASSIGNMENT

Rear Admiral Langdon C. Newmand, MC, USN, former Commanding Officer of the School of Aviation Medicine, Naval Aviation Medical Center, Pensacola, Florida, has been appointed Inspector General, Medical, Bureau of Medicine and Surgery.

PERSONAL NOTE

Captain Hilton W. Rose, MC, USN, Retired, has joined Eaton Laboratories, Norwich, New York, as Director of Medical Research, International Division.

RETIRED

Captain Edwin B. Coyl, MC, USN, retired on November 1, 1960 after more than 30 years continuous active duty. At the time of retirement he was Inspector General, Medical. He and Mrs. Coyl will remain in Washingon, residing at 4545 Connecticut Avenue, N. W.

Captain Merrill G. Wheatcroft, DC, USN, retired on November 1, 1960, after 20 years of active service. He will make his home in Houston, Texas, where he has accepted a position on the staff of the Dental School, University of Texas.

Air Force

Surgeon General—MAJ. GEN. OLIVER K. NIESS

Deputy Surg. Gen.—MAJ. GEN. JOHN K. CULLEN

COMMAND NURSES CONFERENCE

A Command Nurses Conference was recently held in the Office of the Surgeon General of the Air Force. Approximately eighteen Air Force Nurses were in attendance at the meeting which is programmed every two years to present current trends in Air Force nursing and to discuss major problem areas.

U. S. Air Force Photo

(*L to R*) COL. FRANCES I. LAY, Command Nurse, USAFE; COL. DOROTHY ZELLER, Chief, Air Force Nurse Corps; MAJ. GEN. O. K. NIESS, The Surg. Gen. USAF; LT. COL. ANNICE NORRED, Command Nurse, Alaska Air Command; LT. COL. RHODA JAHR, Command Nurse, Hq. Pacific Air Forces.

LEGION OF MERIT

Colonel James B. Nuttall, USAF, MC, presently in graduate training in Public Health at Johns Hopkins University, Baltimore, was awarded the Legion of Merit recently in a ceremony held in Washington, D.C. He was cited for exceptionally meritorious service as Chief, Aviation Medicine Division and Deputy Director of Professional Services, Office of the Surgeon General, from July 15, 1956 to July 31, 1960.

He holds the Commendation Ribbon, USAF Certificate of Achievement in Aviation Medicine, the Bronze Star Medal, the Air Medal with four Oak Leaf clusters and the Distinguished Flying Cross.

COMMENDATION MEDALS

The Air Force Commendation Medal was recently awarded to the following officers in the Office of the Surgeon General: Colonel Lewis H. Oden, Jr., Lt. Colonel Alonzo M. Donnell, Jr., Lt. Colonel Henry M. Woolf, and Major Harry B. Nicely, Jr.

While the presentations were made in the Office of the Surgeon General the citations were for outstanding performance of duty at former stations.

FOOD FOR SPACE TRAVEL

Lt. Colonel Albert A. Taylor, the Air Force's bioastronautics food expert, has just completed a book-form report, "Food for Space Travel." Copies of this report can be procured from the Office of Technical Services, U. S. Department of Commerce, Washington, D.C.

This report gives primary consideration for the spaceman and presents a complete program for providing food and water for manned space flights.

Colonel Taylor is Chief of the Biomedical Division Directorate of Life Sciences, Headquarters Air Research and Development Command, Washington, D.C.

NEW EMBLEM AUTHORIZED

The Medical Service School, Gunter Air Force Base, Alabama, has been authorized a new organizational emblem.

The emblem motto is SERVITUS PER SCIENTIAM—Service through Knowledge. Against a background of blue sky, the primary theater of operations (Air Training Command), the Staff of Aesculapius (god of healing) is displayed in the Air Force medical mission. Two golden rays of light converge at the top of the emblem to indicate the school's high standards. The globe and surrounding space represent the sphere of operation of the Air Force and its support-

ing Medical Service. The Lamp of Knowledge symbolizes the school's function of increasing the knowledge of medical support personnel through education.

Colonel Harold V. Ellingson, Commander of the school, appointed an awards committee to select one of the 26 suggestions that were submitted, Airman First Class Earl Cowan's idea was chosen.

RETIRED

Major Ray E. Van Cleave, USAF, MSC, a graduate of Baylor University with a Master's Degree in Hospital Administration, retired from military service on October 31, 1960. He has taken a position with the Veterans Administration Hospital, Waco, Texas.

During World War II he served in the China-Burma-India Theater. Later he served with the 11th Aeromedical Transport Squadron which was awarded the Air Force Outstanding Unit Award for air ambulance service provided military and Veterans Administration hospitals in the twelve North Central States. He has taken residence at 1100 Lawrence Drive, Waco, Texas.

Public Health Service

Surgeon General—LEROY E. BURNEY, M.D.
Deputy Surg. Gen.—JOHN D. PORTERFIELD, M.D.

POLIO

About 60 percent of the population under 60 years of age have had at least one dose of polio vaccine, according to Dr. Leroy E. Burney, Surgeon General of the U. S. Public Health Service.

He states, however, that "We all should be greatly disturbed that so many babies and pre-school children remain unvaccinated. To date, we have analyzed 1300 paralytic cases that occurred this year (1960) and we have found that 597 of them were children under five. Such tragedies will continue unless we begin, routinely, to start each new baby on his polio shots when he is two to four months old."

ASSIGNMENT

Dr. Ernest M. Allen, Chief of the Division of Research Grants and Associate Director for Research Grants at the National Institutes of Health, has been given full-time staff responsibility as Associate Director. The Director of the National Institutes of Health is Dr. James A. Shannon.

The reassignment has been brought about by the rapid growth and complexity of research grant activities at the Institutes.

DEATHS IN U.S.

Deaths in the United States in 1959 numbered 1,656,814, as recently announced by the Public Health Service. The rate of 9.4 deaths per 1,000 was practically the same as for 1956, but was over one percent lower than the 1958 rate and about two percent lower than that of 1957. The higher rate for 1957 and 1958 was the result of the influenza epidemic.

WATER SUPPLY

The ever present problem of providing an adequate and safe water supply for communities is of major concern to the Public Health Service.

The National Conference on Water Pollution was held in Washington, December 12-14. For the first time, the authorities on wa-

ter resources joined with representatives of the country's many water interests to examine in detail the nationwide water pollution problem.

With the increasing population in the United States there is justified concern about the water supply. This has been mentioned on several occasions in this journal. Research should be speeded on the purification of sea water since many of our very large cities are near the oceans where there is an abundance of water—if only it could be economically rendered fit for use.

MEDICAL STOCKPILE

The Nation's emergency medical stockpile program has been assumed by the Public Health Service. This is part of the National Plan for Civil Defense and Defense Mobilization with aims at developing an organization and procedures for managing medical facilities, personnel and resources for national emergencies.

The transfer of this authority from the Office of Civil and Defense Mobilization to the Department of Health, Education, and Welfare involves about $200 million worth of medical supplies and equipment located at various points about the country.

RESOLUTION OF APPRECIATION

Dr. Henry A. Holle, Medical Director, USPHS, was presented with a Resolution of Appreciation at the Conference of Public Health Veterinarians held at the 1960 American Public Health Association convention, San Francisco. Presentation was made by Dr. R. K. Anderson, President of the Conference.

The resolution commended Dr. Holle for his "outstanding contributions to, and support of, the development and improvement of veterinary public health activities throughout the United States." It noted particularly Dr. Holle's leadership while Texas Commissioner of Health in developing a Division of Veterinary Medicine in the State Department of Health; his personal interest and effective actions in support of the Veterinary Corps of the United States Army, opposing Ex-Secretary of Defense Wilson's 1956 order designed to abolish the corps, and his outstanding role in exploring and publicizing the public health need for official inspection of poultry for wholesomeness.

DR. HENRY A. HOLLE (left) receives a "Resolution of Appreciation" from Dr. R. K. Anderson.

ACUTE CONDITIONS

Acute Conditions (PHS Publ. No. 584-B24), is a 47-page Health Statistics publication covering the period July 1957-June 1960. Price per copy is 34¢ and orders may be placed with the Superintendent of Documents, Government Printing Office, Washington 25, D.C.

Veterans Administration

Chief Medical Director—WILLIAM S. MIDDLETON, M.D.

Deputy Chief Med. Dir.—H. MARTIN ENGLE, M.D.

THE MIDDLETON AWARD

The First William S. Middleton Award for outstanding achievement in medical research, was presented to Dr. S. A. Berson and Dr. R. S. Yalow, Chief and Associate Chief, respectively, of the Radioisotope Service, Bronx Veterans Administration Hospital, New York. The award was given for

their work on radioisotopically labeled insulin.

The Middleton Award, established by friends of Dr. Middleton, will be made annually at the Medical Research Conference of the Veterans Administration.

TB-LIKE DISEASE

Since January 1960, the Veterans Administration has registered 710 cases of a tuberculosis-like disease which has come to the attention of physicians in the U. S.

As yet the disease has no name more specific than "infections due to unclassified mycobacteria." The infections closely simulate tuberculosis and usually affect the lungs.

The highest number of cases has been reported from Califo[illegible], with New York second. Alaska is the only state that has not been reporting the disease.

SEMINAR ON ORAL HEMORRHAGE

Tuskegee, Alabama, Veterans Administration Hospital, recently presented a *Seminar on Oral Hemorrhage*. Seven papers were presented at the one day meeting.

Dr. Clifton O. Dummett, Chief, Dental Service, of the hospital said, "There is a need for scientific documentation of fact, and an obligation to foster research in causation and therapeusis."

This seminar was the third held at the hospital the past year.

Miscellaneous

SIX-YEAR MEDICAL PROGRAM

Boston University will undertake in the fall of 1961 a unified six-year program of college and medical school education so that better physicians can be trained in less time. This announcement was recently made by President Harold C. Case of the University.

The Commonwealth Fund of New York has granted $550,000 to the University to help underwrite the costs of the first four years of the program.

HEALTH SCIENTISTS

How many health scientists does the nation have today? How many health scientists will it need by 1970? These are questions that will be answered by a survey being made by the Federation of American Societies for Experimental Biology.

The pilot phase of the project is being supported by an $87,000 grant from the National Institutes of Health. The University of Pittsburgh has been selected as the project site. Information on the project may be obtained by writing to Dr. John T. Cowles, University of Pittsburgh.

SICKLE CELL ANEMIA PROTECTS AGAINST MALARIA

The malaria parasite cannot use the hemoglobin in the sickle cell because of a deficiency of an enzyme essential to the life cycle of the malaria parasite. Consequently there is immunity to malaria.

This finding is the result of Dr. Anthony C. Allison's work in Kenya, Uganda, and Tanganyika. Dr. Allison of the (English) National Institute for Medical Research, London, brought this study to the Conference on Genetics at the New York Academy of Sciences recently.

Sickle cell genes are commoner in Africans than in North American negroes, but no more so than in some Mediterranean peoples where malaria has been common. However, the cells are not found in natives of Southeast Asia, according to Dr. Allison.

POSITION

Medical Officer (Internal Medicine), GS-13, position is available at Eglin Air Force Base, Florida. The vacancy exists at the U. S. Air Force Hospital and the duties involve physical examinations for military and civilian personnel with supervision of the records pertaining to these examinations.

Interested physicians should submit applications to the Executive Secretary, Board of U. S. Civil Service Examiners, Eglin Air Force Base, Florida, Attn: PGPCB.

NUCLEAR BOMB EFFECTS COMPUTER

A pocket size wheel type computer which calculates initial ionizing radiation, thermal radiation, overpressures, etc., from nuclear bomb explosions is the result of work of the Lovelace Foundation which held a contract from the Atomic Energy Commission. Price for one computer is $1.75; less in quantities. Address: 1404 San Mateo, S.E., Albuquerque, N.M.

MEETINGS

The American Nurses' Association will hold conferences in New York City, February 15-18; Portland, Ore., Feb. 28-March 3; Denver, Colo., March 5-8, and St. Louis, Mo., March 15-18.

Further information on these conferences can be obtained at the headquarters, 10 Columbus Circle, New York 19, N.Y.

The American College of Allergists Graduate Instructional Course and Seventeenth Annual Congress will meet in Dallas, Texas, March 12-17. Further information may be obtained from John D. Gillaspie, M.D., 2141-14th St., Boulder, Colorado.

The Medical Library Association has invited the Second International Congress on Medical Librarianship to meet in Washington, June 16-22, *1963*, at the time set for its own Sixty-Second Annual Convention.

Development of plans for the Congress to date include the appointment of Dr. Frank B. Rogers, as General Chairman and Miss M. Ruth MacDonald as Executive Secretary, and the establishment of an Organizing Committee with special responsibilities for program development. The Congress Secretariat will be located in the National Library of Medicine.

By the time of the meeting the National Library of Medicine will be quartered in its new building on the grounds of the National Institutes of Health, Bethesda, Maryland, at the District of Columbia line.

PUBLICATIONS AVAILABLE

The following publications are available from the Office of Technical Services, Business and Defense Services Administration, U. S. Department of Commerce, Washington 25, D.C.:

Mechanism of Radiation-Chemical Reaction in Biochemical Systems (UCRL-9218), 10 pp., 50¢. Russian-English Dictionary of Operational, Tactical and General Military Terms (60-21783), 359 pp., $5.00. Soviet Research in Cosmic Ray Physics (60-21922), a translation, 5 pp., 50¢.

Chinese Research Related to Infectious Hepatitis in the Past Decade (60-11464), pp., 75¢. (A translation.) On the Effect of Ultrasonic Vibrations on the Blood (60-11942), 8 pp., 50¢. (A translation.)

NEW MEDICAL JOURNAL

The Journal of Surgical Research is expected to circulate its first number in May. Publisher will be W. B. Saunders Company, West Washington Square, Philadelphia 5, Pa.

MEDICAL ELECTRONIC NEWS

A free publication, *Medical Electronic News,* will be distributed, beginning March, to physicians engaged in diagnosis, therapy or research involving instruments, research apparatus, and electronic apparatus. The publication will also be given to research workers whose work involves such instruments. Write to Instruments Publishing Co., Inc., 845 Ridge Ave., Pittsburgh 12, Pa.

STERILIZATION PROCEDURES BOOK

A free 123-page booklet, a compilation of the B-D Lectures on Sterilization presented at the Seton Hall University College of Medicine and Dentistry, is available from the Becton, Dickinson and Company, Rutherford, N.J.

CORRECTION

The Armed Forces Medical Journal discontinued publication with the December *1960* issue. It was stated in MILITARY MEDICINE, December 1960 issue under Department of Defense Notes that *The Armed Forces Medical Journal* would discontinue publication in 1961. That was an error.

Chapter News

We are happy to announce the formation of a new chapter of the Association of Military Surgeons. The New Jersey Chapter was authorized at the Annual Meeting of the Association in November. More news of this later.

At the November meeting of the New York Chapter of Military Surgeons the following officers were elected:

President, Dr. Samuel Candel, 189 Ocean Avenue, Brooklyn

1st Vice-Pres., Dr. Edward A. Barrett, Mt. Kisco, N.Y.

2nd Vice-Pres., Dental Dir. Robert H. Moore, USPHS Hospital, Staten Island, N.Y.

Secretary, Col. James Q. Simmons, Jr., MC, USA, Surgeon, First Army, Governors Island, N.Y.

Treasurer, Dr. Joseph Hirsh, Albert Einstein College of Medicine, New York 61, N.Y.

Ass't. Secretary, CDR John H. Gilpin, Jr., Medical Office, Third Naval District, 90 Church St., New York 7, N.Y.

Honor Roll

Since the publication of our last list, the following sponsored one or more applicants for membership in the Association:

Lt. jg Edna T. Joyce, NC, USNR
Lt. Col. Charles G. McCausland, AUS, Ret.
Lt. Sidney Bellinger, MC, USN
Lt. Col. William A. Easter, CAP, MC
Lt. Col. Evelyn M. Bedard, USAF, NC
Capt. Jack L. Kinsey, MC, USN
Cdr. Helen Samonsko, NC, USN
Capt. Margaret B. Tinney, ANC, DC, NG
Capt. Arthur H. Horton, MC, USNR
Dr. A. R. Turner
Lt. Col. James Chapman, DC, NG
Brig. James A. McCallam, USA, Ret.
Lt. Col. William R. Bunge, MC, USA
Lt. Col. Carl Goetz, MSC, USA.
Lt. Col. William H. Anderson,
Col. C. M. Phillips, MC, USAR
Lt. Col. Carl J. Schopfer, MC, ANG, NJ
Edmund Beacham, M.D.

New Members

LCDR Helen K. Twardos NC, USNR
LCDR Ouida C. Upchurch, NC, USN
Lt. Col. Russell M. Marshall MSC, USAF
Capt. Roger G. Noonan, DC, USA
Cdr. Evelyn I. Coderre, NC, USN
Capt. Albert W. Charbonneau, MC, USAR, Ret.
Capt. Frank John Gavin, DC, USA
Capt. G. E. Vaupel, MC, USN
Lt. Sam T. Knappenberger, MC, USNR
Capt. Harold D. Giddings, MC, USN
Major Dudley F. Powell, MSC, USAF
LCDR Joseph Louis Kurtzman, MC, USN
Lt. Col. Kenneth L. Miller, DC, USAR
Cdr. Peter J. Cornell, DC, USNR
Captain Herbert B. Morgenroth, DC,USA
LCDR Gloria J. Sterling, NC, USN
Capt. Gerhard Zbinden, MC, Swiss Army
William S. Kiser, MD
R. C. Vail Robinson, MD
John Lawrence Sullivan Holloman, Jr., MD
Lt. Abbot Greogry Spaulding, MC, USN
Col. James M. Fairchild, DC, USA
Capt. William M. Leauitt, MSC, USAF
Capt. Thomas J. Rogers, DC, USA
Capt. Marvin Raines, DC, USA
Capt. Albert S. Kramer, DC, USA
Lt. Col. Charles A. Ross, DC, USA
Col. John T. Morrison, MC, AUS, Ret.
LCDR Frank G. Steen, MC, USN
Major Frederick J. Cullen, MC, USA, Ret.
Capt. Richard P. DaKin, DC, USA
Capt. C. R. Gaines, Jr., DC, USA
Capt. Dennis W. Waldrop, DC, USA
Lt. Col. Norman R. Harris, DC, USAR
Lt. Reginald R. Cooper, MC, USNR
Capt. Joseph D. Belzile, DC, USA
Capt. Peter W. Hoagland, MC, USA
Lt. Col. Abraham Richman, MC, USAR

Lt. Connell J. Trimber, MC, USN
Lt. Col. Robert M. Ziehm, DC, USA
Capt. Billy Bedford Epps, MSC, USAR
Capt. Bruce R. Haas, DC, USA
Major Thelma I. Nichols, USAF, NC
Capt. Stanley E. Fields, MSC, USA
Capt. Henry Worth Boyce, Jr., MC, USA
Ruth G. Fortney, VA
Capt. Frederick P. Goldstein, MC, USAR
Col. Arthur G. Siwinski, MC, MD, ANG
Minnie F. Beckman, RN
1/Lt. James G. Taylor, MSC, USA
Med. Dir. Luther L. Terry, USPHS
LCDR Ernest Slentini, USPHS
Major Simon I. Matullessya, MC, Indonesian Air Force
Major C. L. Stoneman, CAP
Capt. L. Roger Knight, MC, USA
2/Lt. Kenneth R. L. Lassiter, MSC, USAR
Juris Paegle, MD
Lt. Col. Fred Sigals, MSC, USAR, Ret.

MEMBERSHIP COMMITTEE

Commander Calvin F. Johnson, MSC, U. S. Navy, Chairman
Mr. George F. Archambault, U. S. Public Health Service
Commander Burdette M. Blaska, NC, U. S. Navy
Lt. Col. Jesse W. Brumfield, MSC, U. S. Army
Lt. Col. Nathan Cooper, U. S. Air Force, (MSC)
Mr. Vernon O. Trygstad, Veterans Administration

Deaths

CLARK, Herbert C., M.D., D.Sc., died at his home in Allentown, Pa., November 8, 1960, on the eve of his 83rd birthday.

A native of Economy, Indiana, Doctor Clark studied for three years at Earlham College in preparation for medical school. In 1906 he received his M.D. degree from the University of Pennsylvania. In 1909 he became pathologist at the Board of Health Laboratory in the Panama Canal Zone. He held this position till 1922 with the exception of two years spent in the Medical Corps of the U. S. Army during World War I. Upon release from active duty he held the rank of lieutenant colonel and held that rank in the reserves until 1941 when he reached the age of retirement.

From 1922 to 1928 he was Director of Laboratories and Preventive Medicine for the United Fruit Company and became Director of the Gorgas Memorial Laboratory in Panama. He retired from this position in 1954. He was an authority on tropical diseases.

He is survived by his son, John Wilson, who has degrees in both dentistry and medicine, and lives at 1510 Lehigh Parkway South, Allentown, Pa.

REDWAY, Laurance D., M.D., esteemed editor of the New York State Journal of Medicine, died on November 18 at the age of 70.

Doctor Redway was a graduate of Harvard Medical School, class of 1916. He was an ophthalmologist and practiced in Ossining, New York. For some years he held a commission as lieutanant colonel, Medical Corps, National Guard of New York. He had been editor of the New York State Journal of Medicine for many years, and the January issue of that journal is a memorial number to him.

NEW BOOKS

Books May Be Ordered Through The Association

Clinical Cardiopulmonary Physiology. 2nd Edition, revised and enlarged. Sponsored by The American College of Chest Physicians. Grune & Stratton, New York and London. Price $28.50.

Epidemiologic Methods. By Brian MacMahon, M.D., Ph.D., D.P.H.; Thomas F. Pugh, M.D., M.P.H.; and Johannes Ipsen, C.M., Dr. Med., M.P.H. Little, Brown and Company, Boston and Toronto. Price $7.50.

The Structure And Dynamics Of The Human Mind. By Edoardo Weise, M.D. Grune & Stratton, New York & London. Price $7.50.

Disc Lesions And Other Intervertebral Derangements. By E. J. Crisp, M.D., D.Phys.Med., (Lond.) The Williams & Wilkins Co., Baltimore, exclusive U. S. Agents. Price $3.75.

Nurses Can Give and Teach Rehabilitation. By Mildred J. Allgire, R.N., R.P.T.; and Ruth R. Denney, R.N., R.P.T., B.S. Springer Publishing Company, Inc., New York. Price $1.25.

Comparative Effects of Radiation. Conference held in San Juan, Puerto Rico, February 1960, sponsored by National Academy of Sciences, National Research Council. John Wiley & Sons, Inc., New York 16, New York. Price $8.50.

The Man Who Rode The Thunder. By Lt. Colonel William H. Rankin, USMC. Prentice-Hall, Inc., Englewood Cliffs, N.J. Price $3.95.

Standard Methods for the Examination of Water and Wastewater. 11th Edition, 1960. American Public Health Association, Inc., New York. Price $10.00.

The Metabolic Basis Of Inherited Disease. Edited by John B. Stanbury, M.D., James B. Wyngaarden, M.D., and Donald S. Frederickson, M.D., McGraw-Hill Book Company, Inc., New York, Toronto, London. Price $30.00.

Principles Of Surgical Practice. By Emanuel Marcus, M.D., Ph.D.; and Leo M. Zimmerman, M.D. McGraw-Hill Book Company, Inc., New York, Toronto, London. Price $12.50.

Medicine As An Art And A Science. By A. E. Clark-Kennedy, M.A., M.D., F.R.C.P.; and C. W. Bartley, M.S., D.M., M.D., M.R.C.P. J. B. Lippincott, Company, Philadelphia and Montreal.

Infectious Diseases Of Children. 2nd Edition By Saul Krugman, M.D., and Robert Ward, M.D. The C. V. Mosby Company, St. Louis. Price $13.00.

Complications In Surgery And Their Management. Edited By Curtis P. Artz, M.D., F.A.C.S., and James D. Hardy, M.D., F.A.C.S. W. B. Saunders Company, Philadelphia and London. Price $23.00.

Enzymes In Clinical Medicine. By Innerfield. The Blakiston Division. McGraw-Hill Book Co., Inc., New York 36, N.Y. Price $11.50.

Clinicopathological Conferences Of The Massachusetts General Hospital. By Castleman and Dudley. Little, Brown and Company, Boston, Mass. Price $12.50.

Fundamentals of Radiobiology. By Professor Z. M. Bacq and Dr. P. Alexander Pergamon Press, Inc., New York 22, New York. Price $7.50.

Atlas Of Exfoliative Cytology, Supplement II. By George N. Papanicolaou, M.D. Harvard University Press, Cambridge 38, Mass. Price $5.50.

BOOK REVIEWS

LEUKAEMIA. Research and Clinical Practice. By F. G. J. Hayhoe, M.A., M.D. (Cantab.), M.R.C.P. (Lond.) 335 pp., 12 colored plates, 196 illust. (b & w). Little, Brown and Company, Boston. Price $16.00.

This is a brilliantly integrated book on Leukemia. The author must have spent countless hours in learning all of the fundamental aspects of biochemistry, histology, pathology, immunology, virology, and radiology as they relate to the various leukemias. Moreover, he must have read, exerpted, and classified thousands upon thousands of articles written in French and German in addition to British and United States publications. And to this he must have devoted untold hours to the clinical management of patients with leukemia.

Thoughtfully planned and sagaciously executed, this text presents to the reader a well co-ordinated study, and consideration is given to all aspects theoretical as well as practical. The illustrations and colored plates are appropriately placed with reference to the text; the bibliography is extensive and at the top of the right hand pages there is a brief listing of the subject matter discussed on that page.

The only adverse criticism that can be offered is that references to the literature of 1959 are few, and such newer chemotherapeutic agents as Endoxan are not mentioned. However, armed with the solid fundamentals presented, any experienced clinician would find the substitution of a new therapeutic agent into the scheme of therapy so well and fully presented, an easy matter. Undoubtedly, such omissions were due to the length of time required to publish the book after receipt of the original manuscript.

Dr. Hayhoe deserves an accolade for writing such a wonderful text. It will certainly be a must for hematologists and oncologists, and will have a great appeal to internists, pathologists, and those scientists engaged in paramedical basic sciences concerned with solving the problems of leukemia.

JULIAN LOVE, M.D.

DEAFNESS. By John Chalmers Ballantyne. F.R.C.S., D.L.O. 254 pp., 71 illust., 32-page directory of schools for deaf and clinics in U.S. Little, Brown and Company, Boston, 1960. Price $8.00.

This treatise on "Deafness" is different. It is technical, but at the same time, readable. There are chapters that are elementary. The author has included many of his own ideas, which might be controversial, but also gives the thoughts of other authorities. The bibliography and the list of schools and clinics would save the student and the writer many hours of searching for references.

This book can not only be used to advantage by the trained otologist, but by the medical student, the general practioner, the pediatrician, internist, and public health nurse. The chapter pertaining to the screening of the pre-school child would make the book worth while to the student, pediatrician and nurse.

I have suggested to the head of the Department of Otology at Indiana University that he make this book required reading for the senior medical students.

R. M. DEARMIN, M.D.

PEDIATRIC NURSING. 4th Ed. By Gladys S. Benz, R.N., M.A. 572 pp., 109 illust. The C. V. Mosby Company, St. Louis. 1960. Price $6.00.

Gladys S. Benz has written her book, *Pediatric Nursing,* with the primary focus on the need of the individual child as a member of a family in the community and has done a remarkable job in computing how the child, his parents, and his nurse interact in providing for continuous growth. She has successfully illustrated through individual units in her book a well-rounded understanding of the child as an individual.

The suggestion for further study and references at the end of each unit lends to the advantage of utilizing this book as a textbook for student nurses. The Author's style and manner of writing tends toward easy and clearly defined reading. The 109 illustrations consisting of comparative and sequence photographs, various types of recent equipment, and graphs are invaluable to those working in pediatrics.

The graph, A Guide to Individual Progress during Infancy, is in color and demonstrates vividly the progressive data necessary during infancy. This chart would be of great assistance to both pediatric doctors and nurses.

Captain Thomas E. Cone, Jr., MC USN, Chief of Pediatrics, NNMC, Bethesda, Maryland, through his kindness, reviewed Gladys S. Benz's book, *Pediatric Nursing* and is of the opinion that it is a well written, "well put together" book and that the unit on Growth and Development of the Child is developed in an excellent manner. He was favorably impressed with the charts illustrated for evaluation of the individual child in pediatrics.

Pediatric Nursing by Gladys S. Benz is an outstanding book for use throughout all phases of the

individual child and is highly recommended by Dr. Cone and myself as a reference and textbook for nurses and other interested professional people.

LCDR HAZEL L. HOGAN, NC, USN

ORAL PATHOLOGY. 5th Ed. By Kurt H. Thoma, D.M.D., F.D.S.R.C.S.(Eng.), F.A.C.D.; and Henry M. Goldman, D.M.D., F.A.C.D. 1523 pp., 1704 illust., 111 in color. The C. V. Mosby Company, St. Louis. Price $27.50.

There can be no doubt that this volume fulfills its intended purpose as a text and reference or for the student, graduate student and clinician in an extremely comprehensive manner. An extensive list of references, including many articles in foreign languages, attests to the broad field from which material was gleaned for this publication. The 1704 illustrations include one hundred and eleven in color —many of which are new and enhance the value of this volume. Roentgenographic interpretations are carefully discussed and greater emphasis has been placed upon microscopic findings than had been done in previous editions. Context is arranged in eight parts—1—Anomalies and Diseases of the Teeth, 3—Odontitis, 3—Anomalies and Diseases of the Head & Jaws, 4—Abnormalities and Diseases of the Temporomandibular Joint, 5—Diseases of the Nerves and Muscles of the Face and Jaws, 6—Mouth Diseases, 7—Diseases of the Salivary and Mucous glands, 8—Tumors of the Jaws. Sections are subdivided into Chapters ranging from 2 to 10 in number. While the main feature of this book is histopathology of oral diseases the scope of contents not only makes it valuable as a text in oral pathology but also as a text and reference in the fields of oral medicine, periodontia, oral diagnosis or any of the recognized specialties of dentistry.

This volume is recommended as a worthy addition to the library of any dentist.

COL. H. G. OTT, USA, RET.

CURRENT SURGICAL MANAGEMENT II. A Book of Alternative Viewpoints on Controversial Surgical Problems. Edited by John H. Mulholland, M.D., Edwin H. Ellison, M.D., and Stanley R. Friesen, M.D., with contributions by 50 authorities. 348 pp., illust. W. B. Saunders Company, Philadelphia and London. Price $8.00.

This volume should be available to all surgeons, most internists and some radiologists. Many controversial subjects are discussed in concise terms for the treatment of a variety of surgical diseases, some of which, under certain circumstances, may be treated medically or radiologically.

This is primarily a book on treatment, as diagnosis is not taken up except in connection with the desirability of selecting a certain type of operation or treatment.

Technique, per se, is not accentuated, but each article relates the anatomical and physiological basis for the author's opinion.

These authorities in special fields state their preferences and their reasons and principles which influence their particular decisions in many controversial fields. This second edition is an elaboration of the first with additional subjects and different facets of the previous subjects.

The list of contributors, which number over fifty, reads like a "Who's Who" of American Surgery.

Of particular interest to the undersigned were the articles on peptic surgery which also included the X-ray therapy of the ulcer and varied concepts on gall bladder and common duct surgery.

Both surgical and medical treatment are discussed in the chapter on "Vascular Surgery." A new concept of pilonidal sinus disease was presented which differs radically from the former opinion that it was congenital in origin.

It is not possible to go into all of the interesting articles discussed in this book. The important thing is that experts differ in opinion so often. This shows that the ideal operation for all cases of the same type has not yet been defined clearly and offers opportunity for further research.

It is of greatest value to the surgeon who is in doubt as to which procedure he should use under most circumstances. In other words, he has a choice of radical, palliative or supportive management.

CAPT. L. L. BEAN, MC, USN

OSTEOCHONDRITIS DISSECANS. By I. S. Smillie, O.B.E., Ch.M., F.R.C.S.(Ed.), F.R.F.P.S. 224 pp., illustrated. The Williams & Wilkins Co., Baltimore, exclusive U.S. agents. Price $12.50.

In the first section of this monograph the author describes the various osteochondroses emphasizing similarities, differences, clinical picture and probable etiology. The general descriptions and the specific case histories presented give a clear picture of the nature of the various lesions and their clinical course. The sections on etiology, stress trauma as the major causative agent and the mechanical aspects of trauma involving the knee in particular have been clearly presented. Approximately one half of the book is devoted to treatment and the surgical aspects are emphasized. An impressive series of over 190 cases of osteochondritis dissecans of the knee is presented of which approximately 10% were treated conservatively. The operations done were removal of loose bodies, meniscectomy, drilling and internal fixation of fragments with nails or screws. One could wish for a greater number of conservatively treated cases for comparison with the operative results. The book is profusely illustrated with roentgenograms, diagrams and color photos of operative fields. It represents the most comprehensive and lucid discussion of the subject yet written.

MAJOR PAUL W. BROWN, MC, USA

Abstract

EKSTEDT, RICHARD D. and GENE H. STOLLERMAN. (Northwestern U. Med. Sch., Chicago.) *Factors affecting the chain length of group A streptococci.* I. *Demonstration of a metabolically active chain splitting system.* Jour. Exptl. Med. *112,* 671-686, 1960.

II. *Quantitative M-anti-M relationships in the long chain test.* Jour. Exptl. Med. *112,* 687-698, 1960.

Group A streptococci induced to form long chains by growth in the presence of homologous anti-M antibody were shown to rapidly fragment into short chains upon addition of an excess of acid-heat extracts or purified M-protein antigen from homologous type organisms. The chain splitting reaction showed temperature and pH optima (37 C, 7.5). It would not occur if the long chains were heat killed, inhibited by sublethal concentrations of mercuric chloride, or exposed to penicillin for 60-90 minutes prior to the addition of the antigen. Pneumococci behaved in an entirely comparable manner in similar experiments. By study of variant strains it was shown that, in general, the most virulent strains grew with the shortest mean chain length in normal serum enriched broth. Dissociation to less virulent variants, which involved a loss of the ability to synthesize M-protein and/or capsules, was accompanied by a marked increase in mean chain length. Enrichment of broth media with normal serum resulted in a shortening of the mean chain length of all strains studied. The chain shortening effect of serum enrichment was most apparent with encapsulated strains. Loss of capsules by mutation or by unfavorable growth conditions resulted in increased mean chain length. The activity of the chain splitting mechanism seemed to be independent of M-protein, however, since encapsulated MO negative variants also formed very short chains in serum enriched media. The physical presence of the capsule was not essential for chain shortening since enzymatic removal of the capsule with hyaluronidase during growth did not affect chain length. These results strongly suggest that chain-splitting of streptococci and pneumococci occurs by an active metabolic process, presumably enzymatic, which is inhibited by the union of surface antigens with specific antibody.

All strains of group A streptococci studied could be induced to form long chains when grown in the presence of homologous anti-M antibody provided: 1. The strain was rich in M-protein content and 2. The antiserum used was of sufficiently high anti-M titer. With sera of very low anti-M antibody titer, and/or strains containing excessive M-protein content the long chain test became negative. Under such conditions the bactericidal test detected anti-M antibody with greater sensitivity than the long chain test probably because of the smaller inoculum employed in the former method. It was also shown that under appropriate conditions, using a minimal antiserum concentration consistant with a positive test, minute amounts of M-protein could be detected by inhibition of the long chain and bactericidal tests. The amount of M-protein required to inhibit these biological tests was below that which could be demonstrated by the conventional capillary precipitin tests.

The splitting of streptococcal chains may be inhibited by the union of antibodies with surface antigens other than M protein. Long chains were formed when M-negative, R-positive strains were grown in sera containing anti-R antibody.

The chain splitting system, which for convenience might be referred to as "scissin," appears to be most active in encapsulated strains with or without M-protein, and its synthesis seems to be influenced by the same cultural conditions that promote capsule and M-protein formation. If the synthesis of a chain-splitting enzyme were under genetic control many of the observations described here might be explained, particularly if this hypothetical gene were closely linked to the gene controlling capsule synthesis. Loss of these closely linked genes by mutation would produce unencapsulated, long chaining variants. Strains containing the hypothetical gene would form large capsules and split into short units under the proper nutritional and cultural conditions. Thus, factors producing either mutation or inhibition of enzyme action or synthesis would cause long chaining.

The inhibition of chain scission of M-positive strains by anti-M antibody, and its reversal by M-protein, is an exquisitely sensitive system for detecting minute quantities of either antigen or antibody. Aside from the theoretical implications of this system, its practical application to the study of streptococcal virulence and immunity is apparent.